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SUMMARY

The economic development of the nation changes many variables that relate to the structure of agriculture. Development encourages population growth at particular locations, causing regional market orientation and production advantages to change accordingly. These changes cause adjustments in the method of farming which in turn affect the return to labor and capital and thus their local prices. The change in the relative prices of labor and capital is such that larger and more specialized operations have a greater advantage. This advantage arises due to the economies of scale and inflexibility in production possibilities associated with modern capital items, as well as the lower price of capital items when compared to labor.

These and other changes are affecting the cattle feeding sector as well as other branches of the farming industry. In recent years, cattle feeding has been under a dual trend; namely, for feeding to become more concentrated in larger feed lots and locationally, to shift generally in a southwesterly direction. Corn Belt cattle feeders have been concerned with these trends. Some express the belief that the Corn Belt region may lose its comparative advantage for cattle fed in relatively small groups.

This study is the first of a series directed to the cattle feeding sector. Later studies will measure the relative advantage of cattle feeding in different regions and with facilities of different sizes. The present study is concerned with changes occurring in the sector of agriculture related to the cattle feeding industry. It serves as a review of changes in scale and location of cattle feeding, feeder cattle production, feed grain production, and interregional cattle movements.

The production of fed cattle is increasing in the United States with a larger proportion of the increase tending to the Southern Plains and the Range States. These regions are large suppliers of feeder cattle, have an expanding feed grain sector and are locationally close to the expanding

market for meat and meat products on the West Coast. Within these regions Texas, Colorado, Kansas, and Nebraska have experienced a relative increase in the proportion of cattle fed in the United States over the period 1962 to 1971. Over this same period Illinois, Iowa, and California, each historically large cattle feeding states, have experienced a reduction in their share of the cattle fed in the United States.

Even with the increase in fed cattle production, the number of feed lots in the United States declined from 1962 to 1971. Most of the decline was in feed lots with less than 1,000 head capacity. Only in the West Coast region was there also a decline in the number of feed lots in the 1,000 to 7,999 head capacity group. For the nation, the largest numerical gain has been in feed lots of 1,000 to 7,999 head capacity. On a percentage basis, however, the feed lots with a capacity of more than 8,000 head showed the largest increase in the United States expanding from 124 to 351 during the 1962 to 1971 period.

The percentage of fed cattle marketed from feed lots of the various capacities changed rapidly between 1962 and 1971. In 1971, 39 percent of all fed cattle were marketed from the 0.2 percent of the feed lots with over 8,000 head capacity as compared to 17.2 percent in 1962 when it only represented 0.1 percent of the feed lots.

While the number of dairy cows in the United States declined by 6.7 million in the period 1962-71, the number of beef cows increased by 9.3 million, to cause an increase in total cow numbers. The Lake States region had the largest percent increase in beef cow numbers, but the Southeast had the largest numerical increase. Nationally, beef cows increased as a percent of all cows from 59.6 percent in 1962 to 75.1 percent in 1971. In 1971, beef cows as a percent of all cows ranged from 93.4 percent in the Southern Plains to 22.0 percent in the Lake States. The Lake States and Northeast regions, formerly involved most heavily in dairy production, had the largest increase in the proportion of all cows represented by beef cows over the last decade.

Production of feed grains in the United States has expanded rapidly

even under the supply-control programs in effect since 1962. The greatest absolute increase in production was in the Corn Belt, the largest regional producer at the outset of the decade. Production increases also occurred rapidly in the Southern Plains and the Range States regions. The increase in Corn Belt production was from higher yields on a smaller acreage while in the Southern Plains and Range State regions, the increase has come from a greater irrigated acreage and better adapted varieties of sorghum and corn. Competition from feed grains imported from other regions and other more profitable alternative uses of land have caused a decline in feed grain production in the Southeast and Northwest regions. The states with the largest tonnage increase in production were Iowa, Illinois, Minnesota, Nebraska, Kansas, and Indiana. Each of these states had an increase in annual production in excess of 4 million tons between 1962 and 1971.

The value of beef production varies greatly by region. The Southern Plains and Corn Belt had 21.1 percent and 19.2 percent of the value of national beef production, respectively. Regions are polarizing in relative importance of the value of beef production in the nation. Regions near the middle of the production scale, in terms of relative importance in the nation's beef production, are moving to either greater production or less production as the trend to specialization continues.

The reduction in feeding operations in some regions is allowing a greater expansion and specialization elsewhere. A major reduction in feeding has taken place in the Southeast; the greatest increases have occurred in the Southern Plains and Range States regions.

Nationally, the beef sector ranks second only to crop production in contribution to the value of farm production. Regionally, beef production is the second most important source of value of farm production in the five western regions, while in the North Atlantic and Lake States regions dairying ranks second. Poultry has second place in the Southeast while pork occupies the second position in the Corn Belt. The reliance on different production activities in different regions only serves to emphasize regional specialization.

The proportion of the value of farm production contributed by the beef sector increased between 1962 and 1971 in all regions except the Lake States. The beef sector provided 41.7 percent of the value of farm production in the Range States, the highest for any region. In the Southern Plains and Corn Belt, each with approximately 20 percent of the national value of beef production, the beef sector accounts for 41.1 percent and 16.1 percent respectively of the total value of regional farm production.

In those regions that are experiencing changes in the beef feeding sector, the value of beef produced fluctuates accordingly, causing additional economic impacts on communities. Some sectors of the business community may be affected by changes in the demand for their products and services. Regional shifts in cattle feeding may affect the local feed processing industry, packing industry, and the financial sector of the community as the use of these facilities is altered in direct relationship to the number of fed cattle produced in the region.

The major variables relating to the location, specialization and supply of feeders include changes in feed grain production, market outlets for finished animals, the location of feeder calves, and trends in commercialization of feeding operations. The Southern Plains region has benefited through the appropriate changes in most of these variables. It, along with the southern states of the Range States region, is producing more of both feed grains and feeder calves. It is relatively close to the growing consumer sector of the West and Southwest and finally, it has led in the development of highly specialized, commercial feed lots. In an absolute sense, the Corn Belt has retained or gained certain advantages. It has a location nearer the large Eastern population. Even in the presence of the supply reduction of land diversion programs of the Federal Government, the Corn Belt increased feed grain production by an amount exceeding that needed to conform with the growth in domestic availability of feeders, the growth in pork production and other general uses. Also, the growth in feeder cattle availability in the Lake States and Southeast regions were trends somewhat favoring the competitive position of Corn Belt cattle feeding activities.

The net competitive advantage of cattle feeding in particular regions can be determined only through more powerful research techniques that incorporate all major variables affecting cattle feeding profitability and interregional linkages among the numerous consuming, feeding, and grain producing regions. Studies underway are designed to allow a complete analysis of this type.

INTRODUCTION

American agriculture has been undergoing a rapid technological and economic transformation over the last three decades. This transformation increased the farm sector's capacity to produce and changed its structure--expected results of national economic growth. A high level of economic development and continued growth cause the real price of capital to decline as its availability increases relative to the nation's work force and supply of land. On the other hand, the forces of economic development cause the real price of labor to increase relative to the price of capital. Associated with growth in national and per capita income are larger investments in human capital and higher wage rates due to the increased demand for professional and skilled labor in the service sector and other industries which produce products having high income elasticities of demand.

As capital declines in price relative to other resources, production processes in agriculture and similar primary industries rely more on this resource and relatively less on labor and land. These trends are apparent in agriculture where the index of production inputs increased from 85 during the 1910-14 period to 112 in 1969. Over the same period the index of labor inputs decreased from 217 to 64. Even with the large decline in labor inputs the index of farm output for this period increased from 52 to 121, indicating an increase in productivity of inputs and a large substitution of non-labor units for labor.[1/]

The changes in the relative prices of labor and capital and the proportions in which they are combined have many implications for the structure and organization of agriculture. Increasingly, the minimum capital input comes as a "large chunk" such as large power, feed handling, and storage equipment. The fixed costs of farming increase accordingly, and farm units and enterprises must be larger if per unit costs of production are to approach the limits implied in modern technology. Farms then tend to become

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1/ Index numbers were obtained from: Changes in Farm Production and Efficiency, A Summary Report 1970, USDA, Statistical Bulletin No. 233, Washington, D.C., (1957-59 levels=100).

larger and more specialized because capital in the forms of equipment and buildings tends to be less adaptable to a wide range of uses. In an agriculture based mainly on labor, farming can more readily be a diversified activity. The abilities of a worker allow him to shift his energies readily among several crops and small poultry, swine, and cattle enterprises. However, when farm production is based largely on capital, this flexibility disappears. Unlike labor, capital in the form of combines, silos, and feed handling equipment cannot readily be switched among uses during different seasons of the year to facilitate modest sized corn, wheat, poultry, and cattle enterprises.

The growing trend toward greater capitalization and specialization of farming has important implications for the size, number, and location of agricultural enterprises. Land-based activities such as crop production may retain their main locational pattern with some shifts due to changes in technology and capital stock which cause the comparative advantage of individual crops to change among regions. Changes and shifts may be more rapid, however, for enterprises which are not so rigidly land based. An example is poultry production. In earlier decades when labor was a greater input for these activities, egg and broiler production were dispersed widely in small enterprises over grain-producing regions where supplementary family labor and off-season operator labor were available. However, with the rapid capitalization and specialization of this enterprise during the 1940's and 1950's, the basic structure of poultry production changed. It shifted from a small supplementary enterprise dispersed mostly over feed-grain areas to large specialized units concentrated in the East, Southeast and a few other areas.

Potentials in Cattle Feeding

Cattle feeding, similar to poultry production in earlier decades, also has been undergoing inportant structural change. A question posed by many Corn Belt cattle feeders is: Will specialization and regional relocation of this activity progress to the extremes already experienced for poultry? Cattle feeding, like poultry and swine production, is not rigidly land

based. The proportion of cattle fed in feed lots with a capacity greater than 1,000 head has been increasing rapidly with important shifts in location toward the Southern Plains.

Earlier in this century cattle feeding also was similar to poultry production in the sense that it was generally a supplementary enterprise. The majority of cattle were fed in relatively small droves in conjunction with feed grain production especially where off-season labor was available.

The complex of forces affecting the locational concentration of cattle feeding differs somewhat from that for poultry and hog production. Furthermore, feeders also represent an input relating to location and transportation costs for the cattle feeding industry. These "prior costs" are much less important in the swine and poultry enterprises where the capital investment in "initial stock" is much less.

Other forces of technological and economic development also affect cattle feeding processes. The declining real costs and growing productivity of capital has caused this resource to serve as a substitute for land; with higher yields per acre, the amount of food for domestic consumption can be produced with less land (but more capital). As a result of this substitution process, the nation has diverted up to 55 million acres from grain production annually during the last decade. A large capital investment in irrigation in the Plains States over the last two decades and the associated growth in feed grain production in these regions near the source of feeders have also affected the comparative advantage of cattle feeding operations in various locations.

OBJECTIVES

Corn Belt farmers have expressed intense interest in and concern over trends in cattle feeding operations. Questions they pose include: Will cattle feeding eventually be concentrated only in large scale feed lots where the process is continuous throughout the year and is on an industrial basis? Will the cattle feeding activity, like poultry production, become less oriented to areas of feed grain production and become concentrated

in regions favored by special factors such as climate, feeder cattle sources, or locations of particular markets and population centers? Will technological advance continue to change interregional comparative advantage in grain and forage production and bring relative shifts among regions in beef cow herds and cattle feeding? Will the conventional cattle feeding operation of the Midwest, droves of a few hundred or less integrated with crop farming, become obsolete in the period ahead?

This study is the initial one of a series designed to answer these and other questions related to the location and structure of cattle feeding operations. The major objectives of the present study are (a) to summarize trends currently underway and (b) to interpret these trends and certain other data which relate to the scale and location of cattle feeding enterprises. The study thus serves as a background for other more detailed studies being initiated to measure interregional relationships, scale economies and farm organizational characteristics of cattle feeding. While subsequent studies will measure optimal locations and enterprise sizes for cattle feeding operations, a main purpose of the current publication is to bring together and summarize ongoing developments in cattle feeding and closely related farming activities. In providing this summary, we also include some historical perspective relating to conventional locations of cattle production, transportation, and feeding.

PROBLEMS IN COMPARATIVE ADVANTAGE AND INTERREGIONAL COMPETITION

Location of cattle feeding operations is a function of variables and forces relating to the comparative advantage of this activity. Historically, the location and interregional pattern of cattle feeding has been determined by a complex of forces including (a) the location of hay and grain production, (b) the costs of transportation for these feeds, (c) the availability of underemployed farm labor during parts of the year in regions of crop agriculture, (d) the size of farms giving rise to this seasonal underemployment, (e) the location of feeder cattle production, (f) the costs of transportation of feeder stock and fat cattle and (g) the location of markets and processing industries. Developments causing these variables to

change may have eventual impacts in altering the location and nature of cattle feeding operations.

Regional Patterns of Production

Regional production patterns are molded by the price system as it reflects the geographic distribution of resources and demands. Transportation costs represent the relationship between equivalent prices at the point of production and point of consumption and are an important determinant of regional production patterns.

Commodities with a high value per unit of weight are cheaper to transport, relative to their value when charges are on a ton mile basis. Hence, transport cost represents a smaller proportion of their total costs and final value. This cost/value relationship encourages production of high specific value goods in regions more distant from final markets, while bulky and perishable commodities are produced close to the market.

A commodity using resources which have high costs at the point of use relative to the demand for the good generally will concentrate in areas where the basic resource endowment is concentrated, especially when the resource is a non-mobile factor like weather or soil. Similarly a commodity which is produced in a complementary relationship with another good will generally be located in conjunction with the latter. Complementary relationships can cause the two products to be more competitive for scarce resources than either alone.

Interregional shifts in production frequently result from technological changes which result in different yield responses among regions. These differential changes in productivity affect the relative advantages (the production possibilities) among regions depending on their relative magnitudes. For example, investments in irrigation can cause feed grains and forage production to grow in comparative advantage in a region which previously has had an advantage in wheat production. Complementary commodities such as livestock also will increase in relative advantage. Population growth that concentrates markets more at some locations and less at others also will affect the relative economic advantage of commodities by regions,

especially in relation to transportation costs.

Historical Patterns of Beef Production

Over time, and especially in earlier decades, market location and accessibility have been important factors in determining the location of beef production. Farmers who wanted livestock products took their cattle along as they pushed the frontier back. A market developed as town dwellers, without their own supply, bought meat as farmers slaughtered and cured their own products. The first commercial meat packing plant in America was established in 1662 by William Pynshon at Boston.[1/] Meat packing facilities then developed mainly in larger cities to pack and cure cattle from nearby sources.

As the frontier pushed West, cattle ready for slaughter were driven from the Ohio territory to packing plants along the East Coast. Eventually, seasonal packing enabled firms to slaughter in the Midwest during the cool winter months and transport cured meat to the Eastern market. Shortly after the Civil War, "ice packing" allowed packing and curing on a year-round basis. This new process enabled Midwestern packers to provide a stable supply of cured beef to the Eastern markets throughout the year. With the advent of railroads, cattle drives were replaced by the train, and live cattle were shipped from the Midwest to provide fresh meat in the East. However, the transport of live animals was soon replaced by the shipment of carcasses in refrigerated railroad cars.

During the current century, the production of feed grains has reached a level far above that needed for direct human consumption, and the feeding of cattle and hogs has developed into a viable operation. Initially, most of the animals were fed in small numbers and were fed only until the farmers' surplus grain was consumed. Then, with the introduction of a meat grading system by the USDA in 1927, the marketing of cattle meeting the qualifications of the higher grades became profitable and the development

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1/ Willard F. Williams and Thomas T. Stout, Economics of the Livestock Meat Industry, The MacMillian Company, New York, 1964, p. 6. Several of the facts cited also come from this publication.

of the fed beef industry proceeded. The initial concentration was in the Midwest, where feed grains were available, and in California where demand and capital availability encouraged both grain and feeder imports. Feeders were transported to the Midwest, fattened on the excess supplies of feed grain, and then transported to Chicago and other areas where history had concentrated the slaughtering facilities. Over time, rapid transportation available for carcass beef (refrigerated trains and trucks) has encouraged a relocation of slaughter plants closer to the areas of concentrated cattle feeding.[1/]

THE REGIONS

In this study, the United States is divided into nine geographical regions based on similarities in the farming sector. Regional comparisons are then made to indicate any shifts occurring in the concentration of the various sectors of agriculture related to the beef feeding industry in the United States. The regions outlined in Figure 1 consisted of:

North Atlantic States:	Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania, Delaware, Maryland, Virginia, West Virginia, North Carolina and South Carolina.
Lake States:	Minnesota, Michigan and Wisconsin.
Corn Belt:	Ohio, Indiana, Illinois, Iowa and Missouri.
Southeast:	Kentucky, Tennessee, Alabama, Mississippi, Arkansas, Louisiana, Georgia and Florida.
Northern Plains:	North Dakota, South Dakota and Nebraska.
Southern Plains:	Kansas, Oklahoma and Texas.
Range States:	Montana, Idaho, Wyoming, Colorado and Utah.
Southwest:	New Mexico, Arizona, Nevada and California.
Northwest:	Washington and Oregon.

1/ See Number of Livestock Slaughter Plants, SRS-8 (Revised) USDA-SRS Crop Reporting Record. May, 1970.

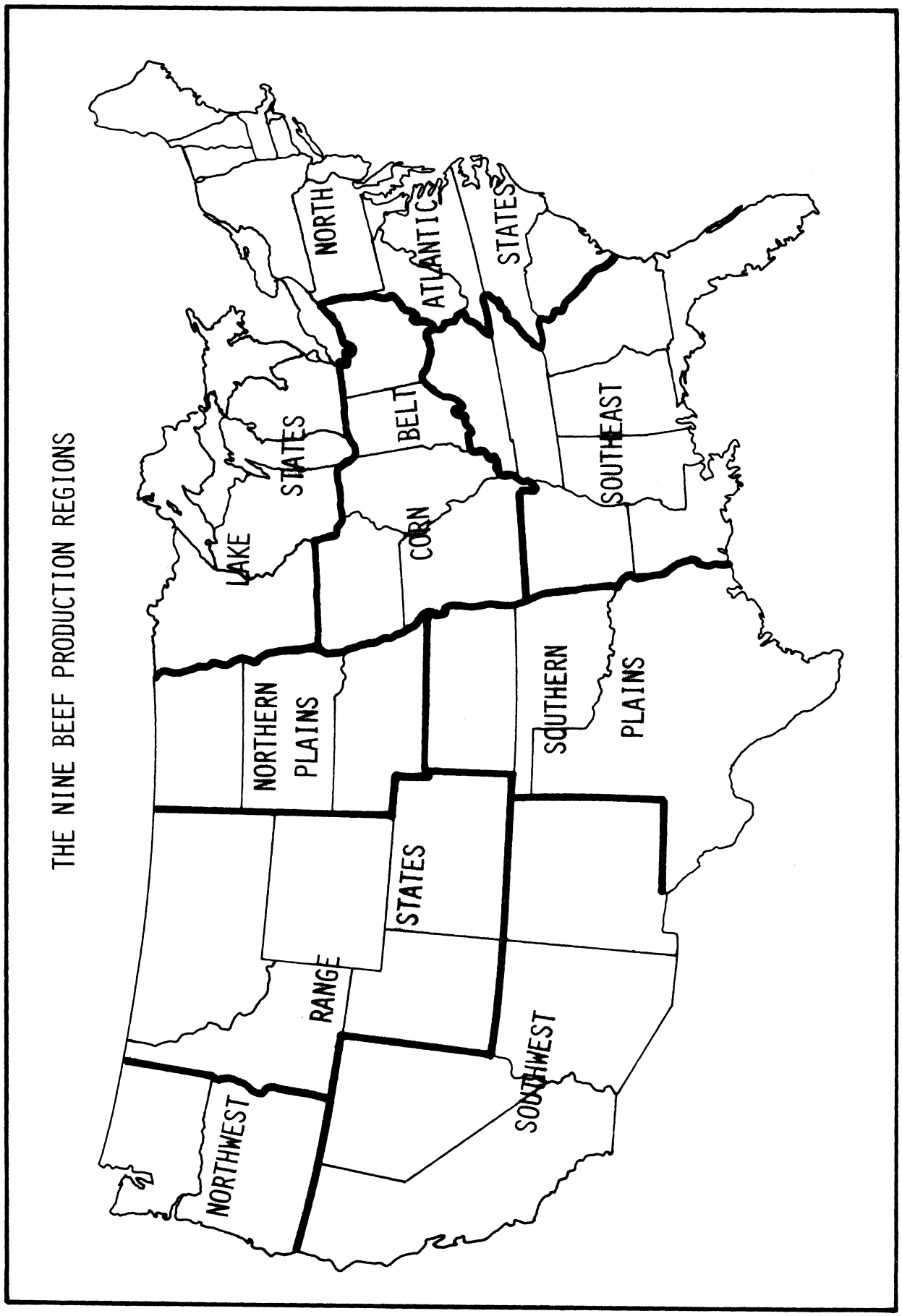
THE NINE BEEF PRODUCTION REGIONS
NORTH ATLANTIC STATES
BELT
SOUTHEAST
LAKE STATES
CORN
NORTHERN PLAINS
SOUTHERN PLAINS
RANGE STATES
NORTHWEST
SOUTHWEST

FIGURE 1.

FED CATTLE PRODUCTION

Fed cattle trends are compared for seven of the nine regions outlined above. No data existed on the number of cattle fed in the North Atlantic States. Data for the Southeast, excluding Louisiana and Arkansas, began in 1964 and were discontinued in 1968.

Fed Cattle Marketed by Region

The number of fed cattle marketed increased in each of the eight regions from 1962-1971 (Table 1). The Corn Belt and Southern Plains were the largest cattle feeding regions in 1971 with 6.6 million and 6.2 million head, respectively. Even though the Corn Belt fed the largest number of cattle in 1971, the 6.6 million head represented a decline from the 7.5 million head fed in 1969. The Southwest and Northwest regions also experienced declines in the number of fed cattle marketed annually toward the end of the 10-year period although the decline was not sufficient to reduce the marketings below the number of fed cattle marketed in the early years of the period. The increase in number of fed cattle marketed in the Lake States, Corn Belt, Southwest and Northwest was not great enough to maintain the percentage share of national production in these regions (Table 2). The Southern Plains increased their share of production by 13.0 percent and the Range States by 2.2 percent. The Corn Belt and the Southwest, with reductions of 9.4 percent and 4.8 percent respectively, shared the major loss in percent of marketings. The Southeast had marketings of only 508,000 head in 1964 and 492,000 head in 1968. The Southeast marketed only about 3 percent of the total for the seven regions plus the Southeast indicated in Table 1.

Fed Cattle Marketed by State

Table 3 indicates the number of fed cattle marketed and the percent of total marketings for each of 21 important feeding states for the period

Table 1. Number of fed cattle marketed annually by region, 1962-71.

Region	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971
					(000)					
Lake States	985	1,036	1,128	1,097	1,150	1,315	1,350	1,259	1,348	1,361
Corn Belt	5,225	5,771	6,037	6,147	6,547	6,964	7,279	7,510	7,381	6,643
Southeast[3]	5/	5/	508	559	573	545	492	5/	5/	5/
Northern Plains	2,409	2,636	3,208	3,174	3,501	3,823	4,230	3,991[1]	4,251	4,419
Southern Plains	1,716	2,064	2,272	2,251	2,943	3,389	3,721	4,876	5,570	6,216
Range States	1,319	1,414	1,566	1,744	1,945	2,017	2,169	2,541	2,523[2]	2,818[2]
Southwest	2,572	2,682	2,865	3,155	3,089	3,000	3,147	3,324	3,219	3,221
Northwest	406	403	437	475	479	496	513	521	514	518
Total[4]	14,632	16,006	17,513	18,043	19,654	21,004	22,409	24,022	24,806	25,196

Source: Cattle on Feed. MtAn 2-1 (1-69) Crop Reporting Board USDA-SRS - Annual January Summaries.

1/ Data not available for North Dakota, assumed equal to 1968.

2/ Data not available for Wyoming and Utah.

3/ Does not include Louisiana and Arkansas where no data were available.

4/ Total does not include the Southeast.

5/ Data not available.

Table 2. Percentage of cattle marketed annually 1962-71 for each of seven regions.

Region	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	Change in Percent Market Share
					(% of 7-region total)						
Lake States	6.7	6.5	6.4	6.1	5.9	6.3	6.0	5.2	5.4	5.4	-1.3
Corn Belt	35.7	36.0	34.5	34.0	33.3	33.1	32.5	31.3	29.8	26.3	-9.4
Northern Plains	16.5	16.5	18.3	17.6	17.8	18.2	18.9	16.6	17.1	17.5	1.0
Southern Plains	11.7	12.9	13.0	12.5	15.0	16.1	16.6	20.3	22.4	24.7	13.0
Range States	9.0	8.8	8.9	9.7	9.9	9.6	9.7	10.6	10.2	11.2	2.2
Southwest	17.6	16.8	16.4	17.5	15.7	14.3	14.0	13.8	13.0	12.8	-4.8
Northwest	2.8	2.5	2.5	2.6	2.4	2.4	2.3	2.2	2.1	2.1	-0.7
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	

Table 3. Fed cattle marketed in selected states.

State	1000 Head Marketed		Percent of market share		Change in percent of market share	1971 as Percent of 1962
	1962	1971	1962	1971	1962 - 1971	
Ohio	376	431	2.6	1.7	-0.9	114.6
Indiana	355	491	2.4	2.0	-0.4	138.3
Illinois	1,265	1,049	8.6	4.2	-4.4	82.9
Iowa	2,687	4,025	18.4	16.0	-2.4	149.8
Missouri	542	647	3.7	2.6	-1.1	119.4
Minnesota	609	875	4.2	3.5	-0.7	143.7
Wisconsin	168	235	1.2	0.9	-0.3	140.0
Michigan	208	251	1.4	1.0	-0.4	120.7
South Dakota	451	597	3.1	2.4	-0.7	132.4
Nebraska	1,822	3,744	12.5	14.8	2.3	201.0
Kansas	774	1,966	5.3	7.8	2.5	254.0
Oklahoma	186	587	1.3	2.3	1.0	315.6
Texas	756	3,663	5.2	14.6	9.4	484.5
Montana	100	235	0.7	0.9	0.2	235.0
Idaho	221	432	1.5	1.7	0.2	195.5
Colorado	815	2,151	5.6	8.6	3.0	263.9
Arizona	568	901	3.9	3.6	-0.3	158.6
California	1,844	1,990	12.6	7.9	-4.7	107.9
Washington	258	361	1.8	1.4	-0.4	139.9
Oregon	148	157	1.0		-0.3	106.1
7-Region Total	14,632	25,196	100.0	100.0	0.0	172.2

1962-1971. Of those listed, only Illinois experienced a reduction in numbers of cattle marketed. While it had a numerical gain in marketings, California had a larger reduction in market share (4.7 percent) than either of these states. Illinois with a 4.4 percent reduction had the second largest loss in market share. California's market share reduction of 4.7 percent, with an increase of 146,000 head marketed, was greater than the market share reduction of Illinois with an actual loss of 216,000 marketed between 1962 and 1971.

With an increase of 9.4 percent, Texas had the largest gain in market share. Other states with increases also were in the Range and Plains regions. Colorado, Kansas, and Nebraska were the only other states to gain more than 2 percent of the market. None of the states of the Corn Belt, Lake States, Southwest, or Northwest regions increased their share of the market. Since 1971 total marketings for the U.S. were 172.2 percent greater than those of 1962, only states with a growth greater than 172.2 percent experienced a gain in market share. The larger the market share of a state the greater the numerical increase in number of marketings required to maintain its relative market position.

FEED LOT CHARACTERISTICS

Ongoing with shifts in the geographic distribution of cattle feeding, adjustment has taken place in the number of farmers feeding cattle and in the capacity of their feed lots. Capacity, as used here, refers to the number of cattle the feed lot can hold (as distinguished from annual feeding limit). Few lots operate continuously at full capacity; as new cattle are brought in some fractional inefficiency occurs. Also, some feeders, especially those with the smaller feed lots, feed only during that time of the year when their labor is released from the crop sector of their farm.

Number and Size of Feed Lots

During the period 1962 to 1971, the number of feed lots in the states making up the seven regions declined from 226,508 to 162,543. Most of

the reduction in feed lot numbers resulted from a decline in feed lots with a capacity of less than 1,000. Increases occurred for feed lots in both the 1,000-7,999 and 8,000 and over capacity groups (Table 4).

The number of feed lots in the two larger capacity groups increased in all regions except the Southwest and Northwest. Both of these regions had declines in the 1,000-7,999 head group. The Lake States, the Corn Belt, and the Northwest had no feed lots with a capacity of more than 8,000 head in 1962. By 1971, the Lake States was the only region with no feed lot with a capacity over 8,000 head.

With 99 such feedlots in 1962, the Southern Plains and the Southwest together had 89.9 percent of the feedlots with a capacity of more than 8,000 head. By 1971, there were 232 feed lots with a capacity of more than 8,000 in these two regions but they accounted for a lower 74.3 percent of the feed lots of this capacity group.

The Corn Belt had 57.2 percent of the total feed lots in the seven regions in 1962 (Table 5) and an almost equal 57.3 percent of the lots in 1971. The Lake States and the Northern Plains had increases in percent of total feed lots. In absolute numbers, none of these three regions have had feed lot reductions paralleling those of the seven-region total.

The Southwest had the greatest change in percent of feed lots in each capacity group (Table 5). However, it started with a small total number, only 1,042 in 1962. The Southwest was the only region which did not have over 90 percent of its feedlots with less than 1,000 head capacity in 1962. By 1971, the Southwest had only 31.4 percent of its feedlots in the less than 1,000 head capacity group. The concentration of feeding in large lots indicates the degree of specialization in this region as small lots are usually associated with supplementary farm enterprises rather than with specialized operations.

The Southern Plains also showed a big change in number of large feed lots. Feed lots with a capacity greater than 1,000 head increased by 42.1 percent between 1962 and 1971. While larger capacity feed lots increased in number, large lots as a percentage of the regions total feed lots

Table 4. Number of feedlots by capacity group in each region, 1962 and 1971

Region	Feedlot Capacity Groups, 1962			Total Feedlots 1962	Feedlot Capacity Groups, 1971			Total Feedlots 1971
	Less than 1,000	1,000 to 7,999	More than 8,000		Less than 1,000	1,000 to 7,999	More than 8,000	
Lake States	32,470	30	--	32,500	26,924	76	--	27,000
Corn Belt	129,394	106	--	129,500	92,993	308	5	93,306
Northern Plains	38,464	328	11	38,803	28,132	561	29	28,722
Southern Plains	18,706	262	23	18,991	10,323	262	140	10,725
Range States	4,209	177	14	4,400	1,534	342	49	1,925
Southwest	601	365	76	1,042	169	249	121	539
Northwest	1,188	84	0	1,272	567	52	7	626
Total	225,032	1,352	124	226,508	160,642	1,850	351	162,843

Source: Number of Feedlots by Size, Groups and Number of Fed Cattle Marketed. 1962-71, SRS-9, USDA-SRS, Crop Reporting Board, June 1966.
Cattle on Feed, Crop Reporting Board. SRS-USDA. January 1972.

Table 5. Percent of each regions feedlots en each capacity group and percent of total feedlots in each region, 1962 and 1971.

Region	Percent of Feedlots by Capacity 1962[a]			Percent of Total feedlots, 1962[a]	Percent of Feedlots by Capacity 1971[a]			Percent of Total feedlots, 1971[a]
	Less than 1,000	1,000 to 7,999	More than 8,000		Less than 1,000	1,000 to 7,999	More than 8,000	
Lake States	99.9	0.1	0.0	14.3	99.7	0.3	0.0	16.6
Corn Belt	99.9	0.1	0.0	57.2	99.7	0.3	0.0	57.3
Northern Plains	99.2	0.8	0.0	17.1	98.0	1.9	0.1	17.6
Southern Plains	98.5	1.4	0.1	8.4	96.3	2.4	1.3	6.6
Range States	95.7	4.0	0.3	1.9	79.7	17.8	2.5	1.2
Southwest	57.7	35.0	7.3	.5	31.4	46.2	22.4	.3
Northwest	93.4	6.6	0.0	.6	90.6	8.3	1.1	.4
All Regions	99.3	.60	.1		98.7	1.1	.2	

a/ Percent for the region specified.

b/ Feedlots in the region as a percent of the seven-region total.

increased by only 2.3 percent in the 1962-71 period. The low percentage increase in high capacity feed lots was a result of the large number of small feeding operations that prevailed in 1962.

Fed Cattle Marketed by Feed Lot Size Group

Most of the increase in the number of cattle fed has been in the larger feed lots, especially those with a capacity greater than 8,000 head. Table 6 shows that the 0.1 percent of the feed lots with over 8,000 head capacity finished 17.2 percent of all fed cattle in 1962. By 1969 the cattle finished in this feed lot size group increased to 39.0 percent of all marketings, even though these lots made up only 0.2 percent of the feed lots in the region.

In 1962, the portion of each region's marketings occurring through feed lots with less than 1,000 head capacity ranged from 95.2 percent of all marketings in the Corn Belt to 4.6 percent in the Southwest. The Corn Belt altered its feeding pattern considerably by 1969 and the Lake States then fed the largest proportion, 91.2 percent, of their cattle in lots of less than 1,000 head capacity. In contrast, by 1969 the Southwest had reduced its marketings from the small size feed lots from 4.6 to 0.4 percent of all its marketings. For most regions, the reduction in percent of cattle marketed through the smaller capacity feed lots was offset by an increase in the percent of marketings from feed lots of more than 8,000 head capacity.

Only the Lake States, Corn Belt, and Northern Plains showed an increase in marketings through the 1,000 to 7,999 capacity group (Table 7). The Southwest and Northwest experienced a decline in number of cattle marketed through feed lots of 1,000 to 7,999 capacity with a shift toward more feed lots with capacity greater than 8,000 head. These changes indicate that even with a declining number of feed lots of less than 1,000 capacity, the number of cattle fed in this group has not been reduced proportionately. These feed lots are also operating closer to their annual capacity than they were in 1962.

Table 6. Percent of fed cattle marketed by feedlot capacity group, 1962 and 1971.

Region	Feedlot Capacity, 1962			Feedlot Capacity, 1971		
	Less than 1,000	1,000 to 7,999	More than 8,000	Less than 1,000	1,000 to 7,999	More than 8,000
Lake States	94.9	5.1	--	91.2	8.8	--
Corn Belt	95.2	4.8	--	89.3	9.9	.8
Northern Plains	77.1	17.1	5.8	50.1	34.3	15.6
Southern Plains	42.2	34.1	23.7	10.4	15.4	74.2
Range States	39.0	35.1	25.9	11.2	33.7	55.1
Southwest	4.6	32.3	63.1	0.4	14.7	84.9
Northwest	42.1	57.9	--	16.0	42.3	41.7
All Regions	63.5	19.3	17.2	41.5	19.5	39.0

Table 7. Number of fed cattle marketed by feedlot capacity groups, 1962 and 1971.

Region	Feedlot Capacity, 1962			Total Marketings	Feedlot Capacity, 1971			Total Marketings
	Less than 1,000	1,000 to 7,999	More than 8,000		Less than 1,000	1,000 to 7,999	More than 8,000	
				(000)				
Lake States	935	50	---	985	1,214	120	---	1,361
Corn Belt	4,975	250	---	5,225	5,933	655	55	6,643
Northern Plains	1,856	413	140	2,409	2,215	1,514	690	4,419
Southern Plains	724	586	406	1.716	645	957	4,614	6,216
Range States	514	463	342	1.319	315	949	1,554	2,818
Southwest	117	830	1,625	2,572	18	493	2,710	3,221
Northwest	171	235	---	406	83	219	216	518
All Regions	9,292	2,827	2,513	14,632	10,450	4,907	9,839	25,196

Source: Cattle on Feed, Mt. An 2-1 (1-69) Crop Reporting Service, SRS-USDA, Annual January Summaries.

Nationally, the major shift in cattle feeding has been to feed lots with capacities more than 8,000 head. The data in Table 7 shows that numerically each capacity group had an increase in cattle marketings. However, from Table 6, only lots with a capacity of more than 8,000 head increased their market percent for the period, the number of marketings increasing from 17.2 to 39.0 percent of total marketings. The 1,000 to 7,999 head capacity group experienced only a slight change from 19.3 to 19.5 percent of the market. The less than 1,000 head capacity group experienced the offsetting decline in market share.

COW NUMBERS

The location of beef herds and feed supplies are two major farm variables affecting the location of cattle feeding operations. This section examines trends and distributions of cow numbers by region. Hence, it is expected that any major changes in the relative regional distribution of beef herds and grain production might alter the interregional distribution and competition in cattle feeding.

Changes in Cow Numbers by Region

There were 47,379,000 cows in the 48 states in 1962 (Table 8). Of these, 59.6 percent were beef cows. By 1971, the number of cows increased to 49,896,000 and beef cows had increased to 75.1 percent of the total. This change in proportions resulted from an increase of 9,235,000 in beef cows and a decline of 6,718,000 in dairy cows.

In 1962, the proportion of beef cows ranged from 85.8 percent in the Southern Plains to 15.4 percent in the Lake States. By 1971, three regions had increased the proportion of beef cows above the 1962 region high of 85.8 percent. These regions were the Southern Plains with 93.4 percent, the Range States with 91.5 percent, and the Northern Plains with 90.2 percent (Table 8). The decline in dairy cow numbers from 1962 to 1971 was one important factor in the increase in proportion of beef cows for regions eastward from the Corn Belt. The smallest change in the proportion of beef cows, 3.0 percent, was in the Southwest while the Corn Belt had the

Table 8. Number of beef cows, dairy cows and all cows, two years old and over by region, 1962 and 1971.

Region	Beef Cows		Dairy Cows		All Cows		Beef Cows as a Percent of All Cows		Change in Percent Beef Cows 1962 to 1971
	1962	1971	1962	1971	1962	1971	1962	1971	
	(000)								
North Atlantic	1,215	1,610	4,346	2,941	5,561	4,551	21.9	35.4	13.5
Lake States	613	930	3,462	3,289	4,093	4,219	15.4	22.0	6.6
Corn Belt	3,597	4,995	4,545	1,821	8,142	6,816	44.2	73.3	29.1
Southeast	5,439	7,815	2,646	1,573	8.085	9,388	67.3	83.2	15.9
Northern Plains	3,593	4,608	906	501	4,499	5,109	79.9	90.2	10.3
Southern Plains	7,505	9,878	1,242	699	8,747	10,577	85.8	93.4	7.6
Range States	3,199	4,319	565	400	3,764	4,719	85.0	91.5	6.5
Southwest	2,162	2,274	995	907	3,157	3,181	68.5	71.5	3.0
Northwest	890	1,037	441	299	1,331	1,336	66.9	77.6	10.7
All Regions	28,231	37,466	19,148	12,430	47,379	49,896	59.6	75.1	15.5

Source: Livestock and Meat Statistics, USDA-SRS Bulletin 333 and Annual Supplements.

largest change with an increase of 29.1 percent.

As a percentage of the nation's total beef cow numbers, the Southeast gained 1.6 percent between 1962 and 1971 (Table 9). The Southwest was a small loser with a 1.6 percent decline. The Southern Plains proportion of total beef cow numbers also declined. The loss by the Southern Plains resulted because it already was high in beef cow numbers, had only a medium number of dairy animals and otherwise did not have the same potential for the adjustment from dairy to beef and in realigning feed use patterns.

The large increase in beef cow numbers, with a simultaneous decline in dairy cows, allowed the Southeast to increase its relative share of all cows in the 48 states by 1.7 percent. While the Southern Plains had a decline in percent of beef cows it had an increase of 2.7 percent of all cows--the highest for any region. The large initial number of cows in the Southern Plains, combined with a relative decline in dairy cows lower than for the 48 states, caused the percent of all cows to increase even though the region's percent of total beef cows declined.

Beef cow numbers by region for the 10 years 1962-1971 are given in Table 10. The numbers in the North Atlantic, Lake States, and the Range States increased at fairly constant rates from 1962 to 1971. The number of beef cows in the Corn Belt, Northern Plains, and Southern Plains increased rapidly until 1965, then the increase continued at a slower pace. The Southeast increased rapidly from 1962 to 1966 then after a small increase in 1967 and 1968 had another large increase from 1969 to 1971. The Southwest increased to a peak in 1967 and then declined slowly through 1971. The Northwest region, reaching a peak in 1968, began a reduction in beef cow numbers in 1969 which continued through 1971.

Changes in Cow Numbers by State

Of the states included in Table 11, only Arizona experienced a reduction in beef cow numbers over the 1962-71 period. Of the 28.2 million beef cows in the 48 states in 1962, Texas had 4.5 million. Oklahoma and Nebraska each had approximately 1.6 million head. Other states with over a million beef cows in 1962 were Kansas, South Dakota, Missouri, Montana,

Table 9. Percent of total beef cows, dairy cows, and all cows two years old and over in each region, 1962 and 1971.

Region	Beef Cows		Dairy Cows		All Cows	
	1962	1971	1962	1971	1962	1971
North Atlantic	4.3	4.3	22.7	23.7	11.7	9.1
Lake States	2.2	2.5	18.1	26.5	8.6	8.4
Corn Belt	12.7	13.3	23.7	14.7	17.2	13.7
Southeast	19.3	20.9	13.8	12.6	17.1	18.8
Northern Plains	12.7	12.3	4.7	4.0	9.5	10.2
Southern Plains	26.6	26.3	6.5	5.6	18.5	21.2
Range States	11.3	11.5	3.0	3.2	7.9	9.5
Southwest	7.7	6.1	5.2	7.3	6.7	6.4
Northwest	3.2	2.8	2.3	2.4	2.8	2.7
48 State Total	100.0	100.0	100.0	100.0	100.0	100.0

Table 10. Number of beef cows two years old and over on January 1 by region.

Region	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971
North Atlantic	1,215	1,244	1,271	1,371	1,405	1,428	1,450	1,528	1,604	1,610
Lake States	631	683	743	786	807	813	842	879	897	930
Corn Belt	3,597	3,773	3,971	4,183	4,453	4,516	4,671	4,716	4,915	4,995
Southeast	5,439	5,778	6,185	6,405	7,117	7,117	7,283	7,549	7,835	7,815
Northern Plains	3,593	3,778	4,167	4,402	4,450	4,475	4,501	4,516	4,571	4,608
Southern Plains	7,505	8,157	8,558	8,611	8,774	8,836	9,032	9,297	9,750	9,878
Range States	3,199	3,370	3,546	3,736	3,914	3,940	4,092	4,111	4,332	4,319
Southwest	2,162	2,169	2,294	2,271	2,378	2,426	2,372	2,361	2,366	2,274
Northwest	890	941	994	1,031	1,046	1,045	1,071	1,045	1,058	1,037
48 State Total	28,231	29,893	31,729	32,796	34,344	34,596	35,314	36,002	37,328	37,466

Source: Livestock and Meat Statistics, USDA-SRS, Bulletin 333 and Annual Supplements.

Table 11. Number of beef cows, dairy cows and all cows, two years old and over in 1962 and 1971 for selected states and 48 state total.

State	Beef Cows		Dairy Cows		All Cows		Beef Cows as a Percent of All Cows		Change in Percent Beef Cows 1962 to 1971
	1962	1971	1962	1971	1962	1971	1962	1971	
	(000)						(percent)		
Minnesota	383	536	1,435	981	1,818	1,517	22.1	35.3	13.2
Wisconsin	135	257	2,402	1,846	2,537	2,103	5.3	12.2	6.9
Michigan	113	137	708	462	821	599	13.8	22.9	9.1
Ohio	272	375	742	449	1,014	824	26.8	45.5	18.7
Indiana	362	444	463	234	825	678	43.9	65.5	21.6
Illinois	708	750	616	301	1,324	1,051	53.5	71.4	17.9
Iowa	1,028	1,517	925	486	1,953	2,003	52.6	75.7	23.1
Missouri	1,227	1,909	716	351	1,943	2,260	63.2	84.5	21.3
Kentucky	628	1,087	549	340	1,177	1,427	53.4	76.2	22.8
Tennessee	573	948	537	302	1,110	1,250	51.6	75.8	24.2
Mississippi	838	1,285	376	191	1,214	1,476	69.0	87.1	18.1
Alabama	692	915	259	134	951	1,049	72.8	87.2	14.4
Georgia	540	856	226	147	766	1,003	70.5	85.3	14.8
Florida	748	917	194	193	942	1,110	79.4	82.6	3.2
Louisiana	569	877	271	169	840	1,056	67.7	84.0	16.3
Arkansas	851	920	234	97	1,085	1,017	78.4	90.5	12.1
North Dakota	687	964	296	137	983	1,101	69.9	87.6	17.8
South Dakota	1,327	1,731	270	177	1,597	1,908	83.1	90.1	7.0
Nebraska	1,579	1,913	340	187	1,919	2,100	82.3	91.1	8.8
Kansas	1,387	1,899	374	198	1,761	2,097	78.8	90.6	11.8
Oklahoma	1,622	2,188	264	146	1,886	2,334	86.0	93.7	7.7
Texas	4,496	5,791	604	355	5,100	6,146	88.2	94.2	6.0

Table 11. Continued.

State	Beef Cows 1962	Beef Cows 1971	Dairy Cows 1962	Dairy Cows 1971	All Cows 1962	All Cows 1971	Beef Cows as a Percent of All Cows 1962	Beef Cows as a Percent of All Cows 1971	Change in Percent Beef Cows 1962 to 1971
Montana	1,141	1,570	81	42	1,222	1,612	93.4	97.4	4.0
Idaho	420	596	221	159	641	755	65.5	78.9	13.4
Wyoming	551	696	30	17	581	687	94.8	97.6	2.8
Colorado	815	1,110	127	101	942	1,211	86,5	91.7	5.2
Arizona	366	344	54	52	420	396	87.1	86.9	-0.2
California	858	906	881	806	1,739	1,712	49.3	52.9	3.6
Washington	318	361	271	192	589	553	54.0	55.6	1.6
Oregon	572	676	170	107	742	783	77.1	86.3	9.2
48 State Total	28,231	37,466	19,148	12,430	47,379	49,896	59.6	75.1	15.5

and Iowa. With 37.0 million head in the 48 states by 1971, Texas, Oklahoma, and Nebraska were still the three leading states in beef cow numbers. However, Mississippi, Kentucky, and Colorado also had over a million head of beef cows in 1971.

In the 1962 proportion of all cows represented by beef cows ranged from 5.3 percent in Wisconsin to 94.8 percent in Wyoming (Table 11). By 1971 the portion of beef cows in Wisconsin increased to 12.2 percent while the proportion in Wyoming increased to 97.6 percent. In the Range and Plains States, the increase in percentage beef cows ranged from 2.8 in Wyoming to 17.8 in North Dakota. Aside from Florida, all states in the Corn Belt and Southeast increased beef cows as a percentage of all cows by 14 or more percent. The percentage beef cow numbers in Florida increased to 82.6 in 1971, higher than other states with larger increases. However, Tennessee increased its beef cows from 51.6 to 75.8 percent of all cows for the largest increase of any state. Iowa was second in the change in the percent beef cows going from 52.6 percent in 1962 to 75.7 percent in 1971. The 1962 percentage of beef cows in the Southeast and Corn Belt regions ranged from 26.8 percent in Ohio to 79.4 percent in Florida. By 1971, percentage of beef cows in these two regions increased to 45.5 percent in Ohio, at the lower end and 90.5 percent in Arkansas, at the upper end. A majority of states, however, were nearing the upper end of this range by 1971.

The majority of states had approximately three percent of the nation's beef cow numbers in 1962 (Table 12). The only states with over four percent were Texas with 15.9 percent, Oklahoma with 5.8 percent, Nebraska with 5.6 percent, Kansas with 4.9 percent, South Dakota with 4.7 percent, Missouri with 4.4 percent, and Montana with 4.0 percent. Each of these states remained above the 4.0 percent level by 1971 while Iowa had increased to where it had 4.1 percent of the nation's beef cows by 1971. All states in the Southeast except Alabama, Florida and Arkansas increased their proportion of the nation's beef cattle over the period 1962-71. Several states with large proportions of the nation's beef cow numbers in 1962 had a further increase in absolute numbers but a decrease in percent of the nation's

Table 12. Percent of 48 state total beef cows, dairy cows, and all cows, two years old and over in each state, 1962 and 1969.

State	Beef Cows		Dairy Cows		All Cows		Change in Percent of 48 State Total 1962 to 1971		
	1962	1971	1962	1971	1962	1971	Beef Cows	Dairy Cows	All Cows
Minnesota	1.4	1.4	7.5	7.9	3.8	3.0	0.0	0.4	-0.8
Wisconsin	0.5	0.7	12.5	14.9	5.4	4.2	0.3	2.4	-0.8
Michigan	0.4	0.4	3.7	3.7	1.7	1.2	0.0	0.0	-0.5
Ohio	1.0	1.0	3.9	3.6	2.1	1.7	0.0	-0.3	-0.4
Indiana	1.3	1.2	2.4	1.9	1.7	1.4	-0.1	-0.5	-0.3
Illinois	2.5	2.0	3.2	2.4	2.8	2.1	-0.5	-0.8	-0.7
Iowa	3.6	4.1	4.8	3.9	4.1	4.0	0.5	-0.9	-0.1
Missouri	4.4	5.1	3.7	2.8	4.1	4.5	0.7	-0.9	0.4
Kentucky	2.2	2.9	2.9	2.7	2.5	2.9	0.7	-0.2	0.4
Tennessee	2.0	2.5	2.8	2.4	2.3	2.5	0.5	-0.4	0.2
Mississippi	3.0	3.4	2.0	1.5	2.6	3.0	0.4	-0.5	0.4
Alabama	2.5	2.4	1.4	1.1	2.0	2.1	-0.1	-0.3	0.1
Georgia	1.9	2.3	1.2	1.2	1.6	2.0	0.4	0.0	0.4
Florida	2.7	2.5	1.0	1.6	2.0	2.2	-0.2	0.6	0.2
Louisiana	2.0	2.4	1.4	1.4	1.8	2.1	0.4	0.0	0.3
Arkansas	3.0	2.5	1.2	.8	2.3	2.0	-0.5	-0.4	-0.3
North Dakota	2.4	2.6	1.6	1.1	2.1	2.2	0.2	-0.5	0.1
South Dakota	4.7	4.6	1.4	1.4	3.4	2.8	-0.1	0.0	0.4
Nebraska	5.6	5.1	1.8	1.5	4.1	4.2	-0.5	-0.3	0.1
Kansas	4.9	5.1	2.0	1.6	3.7	4.2	0.2	-0.4	0.5
Oklahoma	5.8	5.8	1.4	1.2	4.0	4.7	0.0	-0.2	0.7
Texas	15.9	15.5	3.2	2.9	10.8	12.3	-0.4	-0.3	1.5

Table 12. Continued.

State	Beef Cows		Dairy Cows		All Cows		Change in Percent of 48 State Total 1962 to 1971		
	1962	1971	1962	1971	1962	1971	Beef Cows	Dairy Cows	All Cows
Montana	4.0	4.1	0.4	0.3	2.6	3.2	0.1	-0.1	0.6
Idaho	1.5	1.6	1.2	1.3	1.4	1.5	0.1	0.1	0.1
Wyoming	2.0	1.9	0.2	0.1	1.2	1.4	-0.1	-0.1	0.2
Colorado	2.9	3.0	0.7	0.8	2.8	2.4	0.1	0.1	-0.4
Arizona	1.3	0.9	0.3	0.4	0.9	0.8	-0.4	0.1	-0.1
California	3.0	2.4	4.6	6.5	3.7	3.4	-0.6	1.9	-0.3
Washington	1.1	1.0	1.4	1.5	1.2	1.1	-0.1	0.1	-0.1
Oregon	2.0	1.8	0.9	0.9	1.6	1.6	-0.2	0.0	0.0

total in the period 1962-71. Declines in percentage of the nation's beef cows were Texas and Nebraska with a decline of 0.3 percentage points, and Kansas with a decline of 0.1 percentage points. Montana and Missouri, two states with over four percent of the nation's beef cows, had further increases of 0.1 percent and 0.7 percent by 1971.

Changes in percentages of beef cows in the various states generally followed shifts in concentration and relative importance of dairy production (Table 12). California, Wisconsin, Minnesota and Michigan all increased the proportion of the nation's dairy cows but decreased the proportion of beef cows. Nearly all of the other states increased the percentage of the nation's beef cows but had a parallel decrease in dairy cows. This source of changing relative importance in beef cows (i.e., the reduction in dairy cows) resulted especially from the improved technology in mild production and a greater degree of specialization in this enterprise. The trend began in the 1940's, reached a peak in rate of change in the 1950's but still had considerable force in the 1960's. However, it is not expected to be an important source of change in beef production in the 1970's.

FEED GRAIN PRODUCTION

Since feeder animals and feed grain are the two major inputs in production of fed cattle, potential changes in the location of feed production might also be expected to alter interregional comparative advantage in cattle feeding. Hence, this section examines regional changes in production of feed grains.

The development of new varieties, different agronomic practices, and expanding irrigation projects have resulted in changes in the type and location of feed grain production in the 48 states. The production of a larger quantity of feed grains in a region can have a noticeable effect on the existence and potential size of a competitive cattle feeding sector.

Feed Grain Production by Region

National production of the feed grains (corn, oats, barley, and grain sorghum) increased by 44 percent from 139.7 to 201.5 million tons of feed units, between 1962 and 1971 (Table 13). This increase of 61 million tons took place even though large-scale federal programs were used during the period to retire land and hold down feed grain output. Only the Northwest had a decrease in feed grain production in the 1962-71 period. The largest absolute increase in feed grain production was in the Corn Belt where 1971 output exceeded 1962 production by 33 million tons. The Northern Plains and Lake States had increases in production near 27 million tons. However, the Southwest had the largest percentage increase.

The development of irrigation projects in the Southern Plains and the southern part of the Range States was an important prerequisite for increased feed grain production. The development of improved sorghum and hybrid corn varieties for the Southern Plains allowed increased feed grain production through both greater per acre yields and a larger acreage devoted to those crops. Prevailing wheat surpluses, lower market prices for wheat and retirement of land from wheat also encouraged a shift to feed grain production in several of the Range States which are primarily wheat producing areas. Most of the increase in Corn Belt feed grain production was because of the increased yields resulting from the use of more fertilizers and other chemicals and many new hybrid corn varieties. Increased yields from these and other production increasing technologies more than offset a reduced acreage generated through the Feed Grain Program.

The Southeast has not experienced a large increase in feed grain production, even though demand increased as the poultry and beef cow sectors of agriculture expanded in this region. Competition between the railroads and the Mississippi River barges have reduced the cost of shipping feed grains from the Corn Belt into the Southeast. During the 1960's the shipment of feed grains to the Southeast from the Corn Belt mostly went to

Table 13. Feed units of feed grains produced by region.

Region	1962	1965	1968	1969	1971	Percent Change 1962-71
			(000 tons)			
North Atlantic	7,709	9,587	8,616	9,872	10,162	31.8
Lake States	18,259	18,953	22,989	21,824	27,363	49.9
Corn Belt	65,257	76,869	79,869	80,074	98,258	50.6
Southeast	7,004	8,883	6,562	6,058	8,986	27.6
North Plains	20,753	19,858	20,674	25,722	26,545	27.9
South Plains	13,165	15,041	18,121	18,223	20,451	55.3
Range States	3,326	3,536	3,154	4,191	4,434	33.3
Southwest	2,130	3,525	4,010	3,678	4,036	89.5
Northwest	2,095	965	611	994	1,310	-34.8
48 State Total	139,698	157,217	164,557	170,636	201,544	44.3

Source: Crop Production, Annual Summary; USDA-SRS Crop Reporting Board. CRPB 2-1 (62-71).

Louisiana and the export market through New Orleans.[1/] Even though most of the incoming grain moves into the export market, it is direct competition with local grain production which otherwise could be exported. The expanding market for soybeans also has affected the production of feed grains. While national acreage of soybeans expanded by 54 percent in the 1962-71 period, the acreage in the Southeast increased by 134 percent.[2/]

The changing comparative advantage among regions in feed grain production is better illustrated in the share of national production contributed by each region (Table 14). During the 1962-71 period the Northern Plains was the only region to experience more than a one percent decline in share of national production. The Corn Belt and Southern Plains increased their share of national output while the other regions experienced only small changes in their share of the market.

Data in Table 14 suggest that changing national patterns of feed grain production have not hampered the cattle feeding sector of the Corn Belt. The absolute increase in feed grain production of the Corn Belt was greater than that of any other region. The relative increases in the Southern Plains and Southwest have aided cattle feeding in these regions, however.

Feed Grain Production by State

Table 15 gives feed grain production in 30 important producing states for the years 1962, 1965, 1968, 1969 and 1971. All Corn Belt states had a large increase in production between 1962 and 1971 even though they contributed heavily to land retirement under the Feed Grain Program. The largest tonnage increase was in Iowa where production increased by 11.8 million tons; Illinois with an increase of 9 million tons had the second largest increase. Minnesota was in third place with an increase of 6.5

1/ For an example of the increased shipments of feed grains to the Southeast, see W.H. Thompson, Transportation of Grain and Mixed Feeds from Iowa, Agricultural and Home Economics Experiment Station, Special Report No. 50, Iowa State University. Ames, 1967. p. 6.

2/ Acreages were acres of soybeans for grain as given in Crop Production, Annual Summary, 1962 and 1971. USDA-SRS Crop Reporting Board, CRPB 2-1 (62-71).

Table 14. Percent of national feed units of feed grain production contributed by each region, selected years and change 1962-71.[a/]

Region	1962	1965	1968	1969	1971	Change in Percent of Total 1962-71
North Atlantic	5.5	6.1	5.2	5.8	5.0	-0.5
Lake States	13.1	12.1	14.0	12.8	13.6	0.5
Corn Belt	46.7	48.9	48.5	46.9	48.7	2.0
Southeast	5.0	5.6	4.0	3.5	4.4	-0.6
Northern Plains	14.9	12.6	12.6	15.1	13.2	-1.7
Southern Plains	9.4	9.6	11.0	10.7	10.2	0.8
Range States	2.4	2.3	1.9	2.5	2.2	-0.2
Southwest	1.5	2.2	2.4	2.2	2.0	0.5
Northwest	1.5	0.6	0.4	0.6	0.7	-0.8

a/ National totals computed as those for the 48 continental states.

Table 15. Production of feed grains by states by years.

State	1962	1965	1968	1969	1971	Change in tons 1962 to 1971
			(000 Tons Feed Units)			
Minnesota	10,254	10,522	13,627	13,365	16,734	6,480
Wisconsin	4,860	5,261	6,166	5,437	7,094	2,234
Michigan	3,146	3,170	3,196	3,022	3,536	390
Ohio	6,398	6,676	7,451	7,009	9,306	2,908
Indiana	10,392	13,373	11,998	12,799	15,373	4,981
Illinois	20,427	25,747	25,992	27,447	29,454	9,027
Iowa	22,707	24,353	26,940	27,246	34,591	11,884
Missouri	5,334	6,720	7,438	5,573	9,067	3,733
Kentucky	1,882	2,188	1,999	2,218	2,799	917
Tennessee	1,181	1,410	916	833	1,178	-3
Mississippi	656	704	481	341	505	-151
Alabama	1,028	1,357	638	513	806	-222
Georgia	1,517	1,517	1,696	1,408	2,554	1,037
Florida	260	483	445	398	496	236
Louisiana	195	202	217	154	229	34
Arkansas	284	190	170	186	409	125
North Dakota	3,705	4,005	3,996	4,199	4,031	326
South Dakota	5,060	4,758	5,252	5,971	6,010	950
Nebraska	11,988	11,095	11,426	15,553	16,504	4,516
Kansas	5,675	5,550	6,904	7,645	9,893	4,218
Oklahoma	917	974	1,065	1,196	1,178	261
Texas	6,573	8,518	10,152	9,382	9,379	2,806
Montana	1,348	1,259	1,036	1,688	1,406	58
Idaho	734	829	637	802	963	229
Wyoming	151	191	193	211	253	102
Colorado	894	1,122	1,122	1,323	1,634	740
Arizona	345	591	778	646	546	201
California	2,261	2,465	2,746	2,511	2,775	514
Washington	751	456	303	510	778	27
Oregon	527	510	308	484	532	5
48 State Total	139,698	157,217	164,557	170,636	201,544	61,846

Source: Crop Production, Annual Summary USDA-SRS, Crop Reporting Board, CRPB 2-1 (62-71) 1962 to 1971.

million tons.

Except for Tennessee, Mississippi, and Alabama, the states in the Southeast all had increases in the tons of feed units of feed grain production by 1971, but over the period 1962-71 their production levels were below the 1962 levels.

From the standpoint of feed grain production the two major cattle feeding states of the Corn Belt, Iowa and Illinois, are in a more favorable position than at the beginning of the decade. While their tonnage increase in production was much smaller than for Iowa and Illinois, the large relative increases in Nebraska, Kansas, Oklahoma, Texas, and Colorado enhanced their competitive position in cattle feeding and in bidding feeder cattle away from the central Corn Belt states.

FEEDER CATTLE SUPPLY

A change in the regional distribution of cattle feeding necessitates alterations in prior patterns of feeder movements as the feeders are moved from supply source to demand destinations. Also, changes in the distribution of cow numbers, both regionally and between beef and dairy, affects the potential supply of feeders within a region.

Calves Available for Feeding

Table 16 includes estimates of the number of calves available for feeding in each major region. The procedure used in estimation was as follows: First, the number of calves needed for replacement, both beef and dairy, was subtracted from the total number born. Next, the number of vealers was subtracted since these go into a market that is separate but not independent from the fed beef market.

The total calves in Table 16, however, are not all available for feeding. The calculations do not include death losses or take into account different replacement rates for regions with expanding or contracting cow numbers. Of course, regional imports and exports are major factors relating to the number of animals remaining in a region for fed

Table 16. Potential calves available for feeding by region by year (000 head)[1/]

Region	1963	1964	1965	1966	1967	1968	1969	1970	1971	Change 1962-1971 Head/Percent	
North Atlantic	737	825	740	688	785	998	883	1,092	1,367	630	85.5
Lake States	2,190	2,270	2,380	2,161	2,324	2,324	2,409	2,596	2,775	585	26.7
Corn Belt	3,994	4,103	4,183	4,212	4,336	4,420	4,488	4,627	4,810	816	20.4
Southeast	4,445	4,706	4,655	4,975	5,035	5,119	5,470	5,884	6,186	1,741	39.2
Northern Plains	3,442	3,582	3,859	3,908	3,908	3,973	3,999	4,033	4,124	682	19.8
Southern Plains	5,358	5,746	5,916	6,212	6,206	6,641	6,926	7,403	7,615	2,257	42.1
Range States	2,800	2,942	3.079	3,233	3,310	3,347	3,470	3,640	3,721	921	33.0
Southwest	1,810	1,893	1,942	1,945	2,005	2,099	2,067	2,103	2,151	341	18.8
Northwest	908	938	964	991	984	989	1,000	1,013	1,033	125	13.8
48 State Total	25,684	27,005	27,718	28,325	28,803.	29,890	30,712	32,391	33,782	8,098	31.5

1/ Calves born - replacements calculated - calf slaughter.

cattle production. We can use the figures in Table 16, however, as one indication of potential availability of locally produced feeder stock within a region. The number of calves in Table 16 is designated as the potential supply available to the region in which they are produced.

The number of calves available for feeding, after replacement requirements and the number slaughtered were subtracted from the calves born, increased in all regions between 1962 and 1971. (Table 16). The increase in cow numbers accounted for some of this increase as did the switch from dairy cows to beef cows, which have lower replacement requirements. Another factor which contributed importantly to the increased number of calves potentially available from within each region was the reduction in commercial slaughter of calves from approximately 7.5 million in 1962 to 4.1 million in 1971.[1/] The reduction in calf slaughter was concentrated most heavily in the North Atlantic, Lake States and Southern Plains regions.

The Southern Plains with 7.6 million head of calves above estimated use for replacement or calf slaughter (veal) had the largest potential supply of feeders in 1971. The next largest potential supply was in the Southeast with 6.1 million calves in 1971. The Corn Belt, the largest feeding area, had an internal supply of 4.8 million potential feeders in 1971. It also had nearby potential supplies of 4.1 million in the Northern Plains and 2.7 million in the Lake States.

The region with the largest numerical change between 1962 and 1971 was the Southern Plains with an increase of 2.2 million potential calves. The Southeast was the only other region where the available number of calves increased by more than a million. Calf slaughter in the Southeast did not contribute to the increase in available calves since the 1971 level of slaughter approximated that of 1962; however, both were below the peak year for calf slaughter in 1965 when slightly over 1 million calves

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1/ Source for calf slaughter data is Livestock and Meat Statistics USDA-SRS, Statistical Bulletin 333 and annual supplements.

were slaughtered. The Northwest with an increase of only 125,000 available calves had the smallest numerical increase.

Table 17 shows the excess or deficit of potentially available calves in each region over the number of cattle fed the following year. (Calculating in this manner, the difference suggests excess or deficits of internal demand against supply. However, not all calves go into feed lots in the following year.) The Corn Belt and Southwest had net deficits of calves potentially available in all years relative to cattle fed in the following year. The other five regions for which fed cattle numbers were available showed a surplus of potentially available calves.

From 1962-71, the Lake States had a small increase in the number of calves available in one year relative to the number fed in the next year. However, there was a dip between 1966 and 1968 to a level of 919,000, about 200,000 below the other years. Ranging between a high of 515,000 in 1970 and a low of 476,000 in 1968, the Northwest also showed little change in its inter-year excess of calves. All other regions had a reduction in the excess of calves potentially available in one year over fed cattle in the following year. The Corn Belt and the Southwest had an increasing deficit between 1962 and 1971. The changes in the number of excess calves reflects on three different occurrences. First, the increase in total cow numbers and resulting larger calf population giving a larger number of calves available. Second, the reduction in calf slaughter is allowing more calves to become available for feeding. And finally, the larger demand for fed beef is encouraging the feeding of a larger proportion of the available calves.

The Origin of Feeders Imported into Iowa

Iowa is the largest single cattle feeding state in the United States. It holds this position due to its excess supply of feed grains and central location. Feeder cattle can be moved into Iowa from the north, west or south and fed before being sold in the eastern market. Feeder imports to Iowa have ranged from a low of 2.5 million in 1963 to a high of 3.6 million in 1968 (Table 18). The annual totals show an upward trend in the number

Table 17. Excess of potential calves available over fed cattle marketed[1/].

Region	1962	1963	1964	1965	1966	1967	1968	1969	1970
					(000)				
North Atlantic[2/]	-----	-----	-----	-----	-----	-----	-----	-----	-----
Lake States	1,154	1,141	1,283	1,011	919	974	1,150	1,248	1,414
Corn Belt	-1,777	-1,934	-1,964	-2,335	-2,628	-2,859	-3,022	-2,754	-2,700
Southeast	3/	4,198	4,096	4,402	4,490	4,627	3/	3/	3/
Northern Plains	806	374	685	407	85	-257	8	-218	-295
Southern Plains	3,294	3,474	3,665	3,269	2,817	2,920	2,050	1,833	1,399
Range States	1,386	1,376	1,335	1,288	1,293	1,178	929	1,117	903
Southwest	-872	-972	-1,213	-1,144	-995	-1,068	-1,257	-1,116	-1,070
Northwest	505	501	489	512	488	476	479	499	515
48 State Total[4/]	9,678	9,496	9,675	8,671	7,799	7,481	6,690	7,585	8,586

1/ Calves available minus the number of fed cattle marketed in the next year.

2/ Fed cattle numbers not available.

3/ Requires fed cattle marketings for the year to calculate.

4/ Total marketings subtracted does not include North Atlantic or the Southeast.

Table 18. Number and origin of feeder cattle and calves received in Iowa, 1962 to 1969.

Region	1962	1963	1964	1965	1966	1967	1968	1969
Lake States	98,380	121,925	156,032	151,141	151,684	139,602	148,216	144,864
Corn Belt	323,785	338,024	398,480	420,024	388,208	436,739	552,345	446,246
Southeast	24,218	46,091	52,234	34,936	42,313	48,993	68,446	91,407
Northern Plains	1,366,572	1,187,152	1,430,511	1,435,442	1,527,358	1,572,575	1,579,306	1,392,950
Southern Plains	412,268	364,481	387,143	284,236	454,204	381,635	364,032	274,206
Range States	389,125	340,042	447,419	405,771	488,717	456,725	564,106	520,021
Southwest	69,117	39,877	44,098	20,962	44,290	45,772	31,501	32,264
Northwest	27,426	8,622	25,814	30,608	31,186	34,582	38,406	22,417
Other Imports 2/	55,641	51,809	44,027	64,032	101,268	113,057	150,666	132,864
International 3/	114,707	76,094	58,735	211,940	186,690	90,589	87,882	11,506
Total	2,881,239	2,574,116	3,094,375	3,059,092	3,415,918	3,320,269	3,584,906	3,068,745

Source: Livestock Movement into Iowa, Publication No. 67-3, 1967, and Veterinary Services data for 1967, 1968 and 1969; 1934-1966, Iowa Crop and Livestock Reporting Service, USDA-SRS.

1/ Includes cattle originating from other states included in the Corn Belt region.

2/ Includes the North Atlantic states and inshipments from "other" public stockyards.

3/ Includes Canada and Mexico with Mexico reporting only in 1962 (306) and 1964 (207).

of feeders with sharp fluctuations around the trend. This trend from 1969 to 1971 has probably been reversed as the number of fed cattle marketed in Iowa has declined from 4.6 million in 1969 to 4.0 million in 1971.

The fluctuations are even more visible when examining the data by region. The number of feeder imports from the Southern Plains, the Southwest, and the Northwest and the International market in 1969 declined to a level below 1962. The reduction in imports from these markets relates to the larger numbers being fed in their areas and to competition from the Southern Plains area. The Northern Plains have remained a fairly constant source for Iowa feeder cattle. The Southeast and Range States are the two regions from which the Iowa feed lot operators have drawn the larger number of feeders required to satisfy the needs of their expanding feeding operations. If the trend of increases in cow numbers in the Southeast continues this will enable the Iowa feeders to further expand their purchase of feeders from this area. The Range States and Northern Plains areas also will continue to provide a competitive market for feeders. In these two areas as well as the Southeast Iowa, feeders will have competition from feeders in the Southern Plains and the southern states of the Range State region as feed grain supplies are increased,

The Northern Plains provides Iowa with approximately 45 percent of its feeders (Table 19). The Range States are providing an increasing share, 17 percent in 1969, as are the Lake States which provided 4.7 percent in 1969. The other states in the Corn Belt also provided a large proportion of the feeders for Iowa. But the drop in percent from 15.4 in 1968 to 14.5 in 1969 may be an indication of more competition from the other states in the Corn Belt as they bid for their local feeder supplies to replace feeders no longer as accessable from their conventional markets. Feeders previously available from Missouri may be moving to the Southern Plains and Nebraska as these areas increase the number of cattle fed.

Iowa has relied on a numerical increase in the feeders from the Southeast. This region, however, only provided Iowa with 3.0 percent of its feeder cattle in 1969. Cattle feeding has not developed in the Southeast

Table 19. Percent of total feeder cattle and calves received in Iowa by regions of origin, 1962 to 1969.

Region	1962	1963	1964	1965	1966	1967	1968	1969
Lake States	3.4	4.7	5.1	5.0	4.4	4.2	4.1	4.7
Corn Belt	11.2	13.1	12.9	13.7	11.4	13.2	15.4	14.5
Southeast	0 .8	1.8	1.7	1.1	1.2	1.5	1.9	3.0
Northern Plains	47.5	46.1	46.4	46.9	44.7	47.4	44.1	45.4
Southern Plains	14.3	14.2	12.6	9.3	13.3	11.5	10.2	8.9
Range States	13.5	13.2	14.5	13.3	14.3	13.8	15.7	17.0
Southwest	2.4	1.6	1.4	0.7	1.3	1.4	0.9	1.1
Northwest	1.0	.3	0.8	1.0	0.9	1.0	1.0	0.7
Other Imports[1/]	1.9	2.0	2.7	2.1	3.0	3.4	4.2	4.3
International[1/]	4.0	3.0	1.9	6.9	5.5	2.7	2.5	0.4
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

1/ See corresponding footnotes for Table 18.

and the larger number of calves available for potential use as feeders may allow this region to become one of Iowa's more important sources of feeder cattle in the future.

THE IMPORTANCE OF BEEF PRODUCTION TO THE FARM SECTOR

Within any unit of analysis, be it a region, state or farm, the total agricultural output consists of a combination of products. A change in the comparative advantage in the production of beef alters the locational pattern of rational production. The affect of the shifts in location production of beef on the total output in a region depends on two relationships. First, the increase or decrease in production in the region indicates if the change in comparative advantage shifted toward or away from the region. Second, the magnitude of the beef sector when compared to other farm sectors in the region indicates the relative importance of beef production to the region. A region with only a small proportion of the national beef production but where the beef sector represents a larger proportion of the regions total value of farm production would be more affected by a change in comparative advantage than a region where the beef sector represents a small proportion of the total value of farm production in the region.

Interregional Importance of the Beef Sector

The value of beef produced in the United States increased by $4,391 million or by 67 percent from 1962 to 1970 (Table 20).[1/] During the same period the average value per pound of production received by farmers for beef increased by only 28 percent.[2/] In 1962 the Corn Belt and Southern Plains were the only two regions producing over one billion dollars of beef. By 1970 the Southeast, Northern Plains and Southern Plains each also produced over one billion dollars of beef. In 1970 the Southern Plains produced 22.6 percent of the value of the beef in the 48 states and the Corn Belt followed with 18.2 percent (Table 21). The regions which increased the percent of the value of beef between 1962 and 1970 were the regions in which feeder calf production prevailed. The areas which experienced declines in percent of value production were those in which dairy production was

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1/ The value of production represents total marketing adjusted for inventory change, home consumption and resales of cattle in the market.

2/ Prices were as reported in Livestock and Meat Statistics. USDA-ERS Supplement for 1970 to Statistical Bulletin No. 33, 1971.

Table 20. Value of production of cattle and calves by region, 1962 to 1970.[1/]

Region	1962	1963	1964	1965	1966	1967	1968	1969	1970
North Atlantic	367	349	320	336	387	390	417	472	512
Lake States	550	529	511	541	611	611	632	693	759
Corn Belt	1,465	1,422	1,427	1,517	1,621	1,646	1,714	1,884	1,980
Southeast	714	719	647	750	911	940	1,025	1,192	1,358
Northern Plains	848	870	871	933	1,096	1,157	1,227	1,305	1,435
Southern Plains	1,230	1,261	1,118	1,211	1,554	1,577	1,678	2,080	2,465
Range States	614	618	595	688	811	844	917	1,062	1,172
Southwest	564	571	503	597	664	697	760	883	965
Northwest	166	161	151	169	197	202	220	240	263
48 State Total	6,518	6,500	6,143	6,742	7,852	8,064	8,590	9,811	10,909

Source: USDA, Agricultural Statistics (1962 to 1971).

1/ The value of production is the value of total marketing in terms of each years prices with adjustments for interregional shipments, home consumption and changes in inventory.

Table 21. Percent of the value of production of cattle and calves by region, 1962-70 and change in percentage 1962-70.

Region	1962	1963	1964	1965	1966	1967	1968	1969	1970	Change in Percent
North Atlantic	5.6	5.4	5.2	5.0	4.9	4.8	4.9	4.8	4.7	-0.9
Lake States	8.4	8.1	8.3	8.0	7.8	7.6	7.3	7.1	7.0	-1.4
Corn Belt	22.5	21.8	23.2	22.5	20.6	20.4	19.9	19.2	18.2	-4.3
Southeast	11.0	11.1	10.5	11.1	11.6	11.6	11.9	12.2	12.4	1.4
Norhtern Plains	13.0	13.4	14.2	13.8	14.0	14.4	14.3	13.3	13.2	0.2
Southern Plains	18.9	19.4	18.2	18.0	19.8	19.5	19.5	21.1	22.6	3.7
Range States	9.4	9.5	9.7	10.2	10.3	10.5	10.7	10.8	10.7	1.3
Southwest	8.7	8.8	8.2	8.9	8.5	8.7	8.9	9.0	8.8	0.1
Northwest	2.5	2.5	2.5	2.5	2.5	2.5	2.6	2.5	2.4	-0.1
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	

previously concentrated and also the Corn Belt where cattle feeding is the most emphasized part of beef production. The decline of 4.3 percent of the total value of beef produced by the Corn Belt between 1962 and 1970 was not accompanied by a decline in the value of production. The value of production in the Corn Belt increased from 1,465 million dollars in 1962 to 1,980 million dollars in 1970 (Table 20). The decline in percent of the value of beef produced in the Corn Belt resulted because the value of its production did not increase proportionately as fast as the total production in the 48 states, which increased from 6,518 million dollars in 1962 to 10,909 million dollars in 1970. Regions which import feeders such as the Corn Belt must ultimately expect their share of the value of production to decline. Feeders are imported at a higher price per pound than the value of the gain added in the feed lot. For example, importing a 200 dollar feeder and selling a 300 dollar fat steer adds 200 dollars to the exporting regions production and only 100 dollars to the value of production in the feeding region.

The value of production of cattle and calves per beef cow was calculated for each region for the years 1962 to 1970 (Table 22). The North Atlantic, Lake States, Corn Belt, Northern Plains and Southwest regions produced above average values of production per beef cow. A heavy concentration of dairy cows contributed to the above average value of cattle and calves produced per beef cow in the North Atlantic and Lake States regions. The Corn Belt and the Southwest were above the 48-state average with additions from fattening the imported feeders as well as having a contribution from large dairy sectors.

Those regions which were near or below the 48-state average were exporters of feeder cattle and regions which did not have a very large proportion of the dairy cows. Regions that are exporters of feeder cattle do not retain the value added by the cattle feeding sector but transfer this value to regions such as the Corn Belt and Southwest which depend on feeder imports to sustain their large cattle feeding operations. The regions below the 48-state average as well as the Southwest experienced increases in their average value of production relative to the 48-state average between 1962

Table 22. Value of production of cattle and calves per beef cow by region.

Region	1962	1963	1964	1965	1966	1967	1968	1969	1970
				(dollars)					
North Atlantic	302	280	252	245	275	273	288	309	318
Lake States	871	774	687	688	757	751	750	788	846
Corn Belt	407	377	359	363	364	365	367	400	403
Southeast	131	124	105	117	128	132	141	158	173
Northern Plains	236	230	209	212	246	259	273	289	314
Southern Plains	164	155	131	141	177	178	186	224	253
Range States	192	183	168	184	207	214	224	258	270
Southwest	261	263	219	263	279	287	320	374	408
Northwest	186	171	152	164	189	193	205	230	249
48 State Average	231	217	194	206	229	233	243	273	292

and 1970. The tendency to provide heavier feeder calves and the development of feeding activities in these areas are factors which would tend to raise the regional value of production per beef cow closer to the national average. The North Atlantic, Lake States and Corn Belt regions were not as far above the 48-state average in 1970 as in 1962. The loss of dairy beef as dairy cow numbers decline and the sale of heavier feeder calves tend to reduce the average value of beef produced per beef cow in the regions which previously relied on the dairy sector or imported feeders for their fed cattle sector.

Intraregional Importance of the Beef Sector

The farm sector of any region depends on the production of many products at varying degrees of intensity. Some regions have tended to specialize in the production of a small number of products. The Lake States area provides a high proportion of the dairy products, the Southeast has developed a concentration of poultry producers and the states with large amounts of native pasture specialize in cow-calf or sheep production activities. To determine the proportion of farm income attributable to the beef sector the values of farm production of crops, pork, sheep, poultry and dairy products were calculated and compared to the beef sector for the years 1962 and 1968. In 1962, the proportion of the value of production in the beef sector averaged 16.8 percent over the 48 states with a range from 6.5 percent in the North Atlantic States to 31.5 percent in the Range States (Table 23). The production of cattle and calves accounts for 31.5 percent of the total value of production in the Range States, 27.4 percent in the Southern Plains, and 26.9 percent in the Northern Plains. However, these regions ranked fifth, second and third, respectively, in percent of total value of production of cattle and calves in 1962 (Table 21).

The Corn Belt with 22.5 percent had the largest proportion of the value of production of cattle and calves, Table 21, but received only 15.7 percent of its total value of production from this source in 1962, Table 23, as compared to 49.3 percent and 20.6 percent from the crop and pork sectors, respectively. In 1962 crops provided the major proportion of the value of

Table 23. Percent of the value of production in each farm sector by region, 1962.

Region	Crops[1/]	Beef	Pork	Sheep	Poultry	Dairy	Total
North Atlantic	47.3	6.5	3.3	0.2	16.9	25.8	100.00
Lake States	40.6	13.7	9.6	0.6	6.2	29.3	100.00
Corn Belt	49.3	15.7	20.6	0.6	4.8	9.0	100.00
Southeast	55.9	12.7	5.4	0.2	15.9	9.9	100.00
Northern Plains	55.2	26.9	9.5	1.3	2.7	4.4	100.00
Southern Plains	57.0	27.4	3.4	1.2	4.7	6.3	100.00
Range States	50.4	31.5	1.7	5.7	3.1	7.6	100.00
Southwest	63.4	14.9	0.6	1.2	8.0	11.9	100.00
Northwest	58.2	16.8	1.8	1.6	7.3	14.3	100.00
48 State Total	52.1	16.8	8.5	0.9	8.4	13.3	100.00

Source: USDA, Agricultural Statistics, 1963.

1/ Value of production of the 78 crops listed in Agricultural Statistics.

production in all regions. The beef sector provided the second largest addition to value of production for the Northern and Southern Plains, the Range States, the Southwest and the Northwest. In the North Atlantic and the Lake States the dairy sector provided the second largest proportion of the value of production, while in the Southeast the poultry sector provided the second largest part of the value of production.

By 1970, the three regions in the Plains and Range areas of the United States were dependent on the beef sector for over one-third of their total production as compared to about one-fifth for the 48 states on an average. The Southern Plains received 22.6 percent of the total value of production of cattle and calves in 1970 (Table 21), and this accounted for 41.1 percent of the value of production in the region (Table 24). This compares to the Corn Belt which received a slightly lower, 18.2, percent of the value of production of cattle and calves, Table 21, but this level of output accounted for only 16.1 percent of the Corn Belt's total value of production. A small change in the percentage of the total value of production of beef would cause a greater over-all change in the value of production in the Southern Plains than in the Corn Belt due to the greater reliance on the beef sector by the Southern Plains. This shows that different regions are dependent on different farm commodities and a change in price or the production pattern of any commodity will have a different overall effect on each region.

INTERPRETATION OF THE CHANGES

Previous sections of the report were devoted to changes in some of the numerous variables related directly or indirectly to the cattle feeding sector. Each variable has some influence on the magnitude of the cattle feeding sector in a region but the actual level of feeding is a result of all the variables interacting together.

Interregional Pattern Changes

Table 25 presents a summary of the 1971 levels for six of the several variables presented previously. The seventh column presents an estimate of the tons of feed grains measured in feed units required for the cattle feeding sector of each region. Regions with feed grain production greater than

Table 24. Percent of the value of production in each farm sector by region, 1970.

Region	Crops[1/]	Beef	Pork	Sheep	Poultry	Dairy	Total
North Atlantic	42.8	7.5	4.6	0.2	17.9	27.0	100.00
Lake States	41.1	13.0	9.4	0.3	4.5	30.7	100.00
Corn Belt	49.4	16.1	22.5	0.3	3.9	7.8	100.00
Southeast	48.7	17.4	6.2	0.0	18.6	9.1	100.00
Northern Plains	45.2	35.3	12.4	0.8	1.6	4.7	100.00
Southern Plains	42.4	41.1	4.7	0.9	4.5	6.4	100.00
Range States	42.8	41.7	2.1	3.4	2.7	7.3	100.00
Southwest	58.0	20.1	0.5	0.9	7.7	12.8	100.00
Northwest	57.3	20.1	1.3	0.8	6.3	14.2	100.00
48 State Total	46.9	21.3	9.7	0.6	8.3	13.2	100.00

Source: USDA, Agricultural Statistics, 1971.

1/ Value of production of the 78 crops listed in Agricultural Statistics.

Table 25. Level of various livestock related activities by region, 1971.

Region	Beef Cows	All Cows	Potential Calves Available[1/]	Fed Cattle	Potential Calves over Fed Cattle	Feed Grain Production	Feed Grain Requirements[2/]
			(000)			(000 tons)	
North Atlantic	1,610	4,551	1,367	3/	4/	10,162	-----
Lake States	930	4,219	2,775	1,361	1,414	27,363	2,436
Corn Belt	4,995	6,816	4,810	6,643	-2,700	98,258	9,831
Southeast	7,815	9,388	6,186	3/	4/	8,986	-----
Northern Plains	4,608	5,109	4,124	4,419	-295	26,545	4,905
Southern Plains	9,878	10,577	7,615	6,216	1,399	20,451	7,584
Range States	4,319	4,719	3,721	2,818[5/]	903	4,434	3,635
Southwest	2,274	3,181	2,251	3,221	-1,070	4,036	2,867
Northwest	1,037	1,336	1,033	518	515	1,310	497
48 State Total	37,466	49,896	33,782	25,196	8,586	201,544	32,503
Source Table	8	8	16	1	17	13	

1/ It is assumed that calves in 1970 are available for feeders in 1971.

2/ This represents the tons of feed units of feed grains required to provide for the fed cattle sector. Calculated by using the consumption of feed grains per head as given in Feed Consumed by Various Classes of Livestock, by State, Statistical Bulletin 379, ERS-USDA, 1966. Up-dated to 1969 by a ratio for the U.S. total calculated from National & State Livestock Feed Relationships, Statistical Bulletin 446, ERS-USDA, 1970.

3/ Data not available in 1971.

4/ Requires number of fed cattle to calculate.

5/ See corresponding footnotes Table 1

6/ Total includes the 22 major cattle feeding states.

the calculated requirement have sufficient grain to provide for some of the need of the dairy, pork, and poultry enterprises of the region.

Each column in Table 26 gives the change which occurred in the variable over the period 1962 to 1971. Column five expresses the change in the excess of potential calves over cattle fed as explained in reference to Table 17. Regions with negative values in this column increased the number of fed cattle more than the increase in their potential calves available. This column gives an indication of the change in use of cattle. The U.S. as a region increased the number of fed cattle about 1 million more than it increased the potentially available calves. This indicates that some of the cattle that were previously marketed as non-fed cattle now are moving into the cattle feeding sector. On a regional basis column five would give an indication of the number of cattle which a region must import from other regions or must have transferred from the non-fed cattle sector to meet its expanded cattle feeding sector. The calculation assumes that any increase in the number of potentially available calves moves into the cattle feeding sector.

Column seven, Table 26, gives an estimate of the tons of feed grains required to provide for the expanded cattle feeding sector. With this column it can be determined if the increase in grain production was sufficient to supply the extra grain required to meet the expanded needs of the cattle feeding sector. If the increase in grain production is not great enough to cover the increased need of the expanded cattle feeding sector then grain must either be imported or transferred from some other grain using activity within the region. One of the grain using activities affected could be exporting of feed grains to other regions and the level of this activity would be reduced to make upthe greater local need.

Many of the explanations for the increase in cattle feeding in the Southern Plains have been based on the expansion of the feed grain supply in this area. The 55.3 percent increase in feed grain production in the Southern Plains between 1962 and 1971, Table 27, did not allow for an increase in fed beef production such that the proportion of the increased feed grains would be allotted on a similar basis as feed grains were previously used.

Table 26. Numerical change of various livestock related activities by regions, 1962 to 1971.

	Beef Cows	All Cows	Potential Calves Available	Fed Cattle	Potential Calves over Cattle Fed [1]	Feed Grain Production	Additional Feed Grain Required [2]
				(000)		(000 tons)	
North Atlantic	395	-1,010	630	[3]	[3]	2,453	[3]
Lake States	299	126	585	376	260	9,104	673
Corn Belt	1,398	-1,326	816	1,418	-923	33,001	2,099
Southeast	2,376	1,303	815 [4]	-17 [4]	429 [4]	1,982	-64
Northern Plains	1,015	610	682	2,010	-1,101	5,792	2,231
Southern Plains	2,373	1,830	2,257	4,500	-1,895	7,286	5,490
Range States	1,120	955	921	1,499	-483	1,108	1,934
Southwest	112	24	341	649	-198	1,906	578
Northwest	147	5	125	105	10	-785	101
48 State Total	7,771	2,517	8,098	10,564	-1,092	61,846	13,627
Source Table No.	8	8	16	1	17	13	

1/ Change in this column is from 1963 to 1971.

2/ This column expresses the tons of feed grains required to feed the increase in number of cattle fed. Animal requirements determined as in footnote Table 25.

3/ Number of fed cattle not available.

4/ This change is only between the years 1964 and 1968.

Table 27. Percent change of various livestock related activities by region, 1962 to 1971.

Region	Beef Cows	All Cows	Potential Calves Available	Fed Cattle	Potential Calves over Cattle Fed	Feed Grain Production
North Atlantic	32.5	-18.2	85.5	1/	1/	31.8
Lake States	47.4	3.1	26.7	38.2	22.5	49.9
Corn Belt	38.9	-16.3	20.4	27.1	-51.9	50.6
Southeast	43.7	16.1	39.2	1/	1/	27.6
Northern Plains	28.2	13.6	19.8	83.4	-136.6	27.9
Southern Plains	20.9	20.9	42.1	262.2	-57.5	55.3
Range States	35.0	25.4	33.0	113.6	-34.8	33.3
Southwest	5.2	0.8	18.8	25.2	-22.7	89.5
Northwest	16.5	0.4	13.8	27.6	2.0	-34.8
48 State Total	32.7	5.3	31.5	72.2	-11.3	44.3

1/ Not available due to lack of data for fed cattle marketed over the corresponding period, 1962 to 1971.

The increase of 2.3 million tons annually in grain production from 1962 to 1971 coincided with an additional 5.5 million ton annual requirement for the cattle feeding sector (Table 26). If all the grain was to be supplied from within the region 75 percent of the increase in production would have been needed for the cattle feeding sector. This proportion corresponds to the present use of about 37 percent of all the feed grain produced in the Southern Plains for cattle feeding (calculated from the production and requirements columns in Table 25). In the Corn Belt the proportion of feed grains used in cattle feeding was only 10.0 percent in 1971 while only 6.4 percent of the increase in annual production over the 1962 to 1971 period was required to meet the increased demand for the larger fed cattle sector.

In competition with the cattle feeding sector for the feed grains are the historic dairy, poultry, pork and manufacturing demands. Thus the increase in feed grain production in the Southern Plains cannot in itself be the factor allowing for the increase in fed cattle production. The change in production in this region as in any of the regions must be explained by an examination of many of the interacting variables simultaneously rather than on the merits of a change in only one of these variables.

The increase in milk production per cow that followed the widespread use of artificial insemination and balanced feeding practices has resulted in an increase in production per cow in the dairy sector. As a result, all regions have experienced a decline in dairy cow numbers. In most regions this decline was more than compensated for by the increase in beef cows. However, in the North Atlantic, Lake States, and Corn Belt regions the decline in dairy cow numbers was sufficiently large to cause a decline in the number of cows in the region.

Consumer preference for a leaner cut of beef has removed the premium for highly marbled beef which has been a trademark of the conventional beef breeds. Crossbreds incorporating some of the leaner Eurpoean breeds or the dairy breeds have become more common in the feed lot. The demand for leaner beef has removed much of the penalty under which feeders of dairy beef previously found themselves. The acceptance of dairy beef and the

greater demand for feeders as the demand for fed beef increases has increased the price of feeders from dairy breeds. This higher price has in turn decreased dairy calf slaughter which previously was proportionately high among regions with concentrations of the dairy breeds. The reduction in numbers of calves slaughtered has enabled even those regions which had declines in total cow numbers to show increases in potential calves available (Table 26).

Of the livestock activities in the Lake States region in 1970, dairying provides 30.7 percent of the value of production followed by beef and pork with 13.0 and 9.4 percent of the value of production respectively (Table 24). If the beef produced as a complementary product from the dairy enterprises were removed from the beef sector, then pork would replace the beef operation in importance. In this way it can be seen that dairying, including the feeding of dairy beef as a complementary activity, and pork production are the largest users of feed grains.

Care must be taken in examining the potential number of calves available in the Lake States region. In calculating this value a constant replacement rate was used for dairy cows in all regions. However, the Lake States, especially Wisconsin, have a large market for calves to serve as replacements in the dairy herds of the regions. Thus, some of the potentially available calves are raised and sold to other areas as dairy replacements rather than used as possible feeders. This will tend to reduce the number of possible feeders in the Lake States and increase the number of feeders available in the regions importing the dairy replacements.

The productive capacity for feed grains has enabled the Corn Belt to become the largest producing region for both pork and fed cattle in the 48 states. Even though the Corn Belt does not have a large calf sector, it is located between the large supplies of feeders in the Range and Plains States and the Eastern market for beef. Cattle feeding as a farm activity fits well with the farming patterns of the Corn Belt. Cattle started on feed in the fall after harvest provides the farmer with a use for his idle labor over the winter months, a market for his feed grains, and a use for his roughage. The practice of buying feeders in November and December

weighing between 7 and 8 hundred pounds allows for the sale of a 1,000 pound fat animal in March before the spring field work begins. This practice accounts for the large concentration of feed lots with less than 1,000 head capacity in the Corn Belt. The tendency toward lighter feeder cattle and more capital intensive feed lots have necessitated a movement toward year round feeding operations. The year-round operations have become independent farm segments or enterprises separate from the farm as feeding activities and field crops compete for limited summer labor. The procedure of feeding cattle in small lots that developed in the Corn Belt is in contrast to the large lots which developed in the Southwest where both feeders and feed grains are imported. Economies of scale in transporting feed grains and feeders from their sources encouraged the development of large single enterprise operations which concentrated on cattle feeding. Labor scarcity and accessible capital also encouraged the development of larger feeding facilities.

More recently there has been a shift to the larger, more mechanized lots within the Corn Belt as the feeders there have found it necessary to compete for feeders with the large feeding operation developing in the Southern Plains and Range States. The large scale feed lots are operated as independent businesses with year-round employment and worker benefits competitive with industrial labor demands. The increase in feed grain production, as well as the availability of capital, has allowed the development of these facilities in the Plains and Range State regions. The Southeast and the heavily populated west coast serve as the major export markets for the cattle feeding sector of the Southern Plains. These lots compete directly with the lots in the Southwest where feed grains and feeders must be imported. By utilizing the feed grains which are now available to the local feeders, the Southern Plains feeders need only ship fat cattle or slaughtered beef to the coastal markets.

Expansion of the cattle feeding sector in the Southern Plains region must be bound by the limits of many factors interacting to allocate resources among their many uses. Pork production competes for feed grains, agricultural capital sources, and the labor of the area. In this way pork and beef

production in the Southern Plains must come into a balance with each other and with production in other areas. It is possible that most of the production of fed beef and pork may eventually be located in a very definite region as has poultry in the Southeast and dairying in the Lake States. This area of concentration could be of a bilobal shape encompassing in one lobe the Southern Plains and southern parts of the Range States and Northern Plains and the other lobe including the central Corn Belt region. The southern part of the region then would supply the major markets of the South and Southwest while the Corn Belt area would supply the central and eastern markets with beef and pork. These two major feeding areas would then tend to draw feeders from the Range and Northern Plains states on one side and the Southeast on the other.

The Southeast may in the future develop into a major supply area for feeder cattle. This area has experienced sizable increases in the number of beef cows and in available calves (Table 27). Combining with these increases there was a reduction in the number of cattle fed between 1964 and 1968, Table 26, indicating that the cow-calf section of beef production may be less competitive with the other farm enterprises in this area than is cattle feeding. Arable land can more profitably be used for fruits, vegetables, cotton or soybeans than for the production of feed grains. In the Range and Northern Plains states wheat production competes with feed grain production and as the United States population increases and the world demand for wheat increases this area may specialize even more in wheat production increasing the possibility of a deficit in feed grain production.[1/] Many of the cow-calf operations in the Range and Northern Plains areas are large ranch type operations developed to utilize the large number of acres of native pasture in the area. The ranch type operation usually is not a large producer of grains and a cattle feeding operation in conjunction with the ranch is not necessary to provide a market for feed grains as is done on Corn Belt farms.

1/ States which produce less feed grains than they demand are listed in National and State Livestock - Feed Relationships, USDA-ERS, Statistical Bulletin No. 446, 1970.

This format for farming provides for the development of larger sized feed lots. The lack of available feed grains on the individual farms or ranches does not encourage the development of feed lots. Therefore, when a feed lot develops it must purchase feed grains and the feed lot can gain some economies of scale by purshasing larger quantities and by maintaining a year-round operation. These factors account for the high percentage of larger feed lots in the Range States than in the regions where feed grains are more plentiful (Table 5).

The Range States region has shown above average increases in all the recorded aspects of fed cattle production (Table 27). The increase in beef cows has come from better management and from the decline in the practice of grazing calves till they are long yearlings before placing them in the feed lot. This has released pasture land for a larger total number of cows. The development of many acres of irrigated pasture land also has enabled more intensive cow-calf operations. Large feed lot operations purchasing both feeders and feed grains have developed in the Range States, especially in the Colorado area. These feed lots are taking advantage of the increase in feed grain production and large feeder supply in the area.

Purchasing of both feeders and feed grains and large size feed lots are also characteristics of the cattle feeding sector of the Southwest. In 1971 this region marketed 12.8 percent (Table 2) of the fed cattle with only 6.1 percent of the beef cows (Table 9). The Southwest region has increased its fed cattle production by only 25.2 percent from 1962 to 1971 compared with a 72.2 percent increase in the U.S. (Table 27). One of the variables which was not analyzed in this study was space. The Southwest region is a net importer of population. The greater number of people need space for homes and recreation thus forcing agriculture to other areas. The increased demand for fruits and vegetables has also encouraged the use of the land in the Southwest for their production at the expense of feed grains.[1/] The possibility of water shortages and the pollution of downstream waters by feed lot operations has also discouraged the development

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1/ For an indication of the amount of feed grain imported into the Southwest see National and State Livestock - Feed Relationships op. cit.

of new lots in the Southwest.

The excess of feeder cattle in the Southern Plains and Range States serve as the major source of feeders for the Southwestern feed lot operators. The increase in cattle feeding in the Southern Plains will compete with the Southwest feeders with most of the advantage being to the Southern Plains feeders. Transportation will be the major area of advantage. Advancing technology in cold storage transport has enabled the movement of slaughtered beef with little or no spoilage. The weight differential between feeders and fat cattle carcasses probably is minimal but the major advantage in shipping the carcass is that no stops would be required where the cattle must be unloaded for water and feed. Also, shipping feeders will require a subsequent shipment of feed grains to allow the animals to be fed in the Southwest. Due to these developments the fed beef supplies of the Southwest are likely to originate more and more in the Southern Plains and Southern Range States areas.[1/]

Intraregional Pattern Changes

The rate and direction of change occurring in the region for the different livestock related activities is not necessarily the same as the changes occurring in a state within the region. The 1971 state levels for some of the variables related to cattle feeding are given in Table 28 with the change in the value of the variable from 1962 to 1971 given in Table 29.

Both Illinois and Iowa are included in the Corn Belt region but their individual changes did not necessarily correspond closely to the over-all change in the region. Iowa was able to maintain its absolute position in fed cattle production relative to the other states while Illinois dropped behind as the number of fed cattle marketed declined by 216 thousand head. However, the increase of 1.3 million in fed cattle marketed failed to keep Iowa above the 72.2 percent increase in fed cattle marketings in the United

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1/ Changes in the regional production and transportation patterns are examined in: Williams, W.F. and R.A. Dietrich, An Interregional Analysis of the Fed Beef Economy, Agricultural Economics Report No. 88, USDA-ERS Iklahoma and Texas Agricultural Experimental Stations, 1966.

Table 28. Level of various livestock related activities for 10 states, 1971.

Region	Beef Cows	All Cows	Potential Calves Available[1/]	Fed Cattle	Potential Calves over Fed Cattle	Feed Grain Production	Feed Grain Requirements[1/]
				(000)			
Minnesota	530	1,517	1,168	875	293	16,734	1,566
Illinois	750	1,051	620	1,049	-429	29,454	1,553
Iowa	1,517	2,003	1,379	4,025	-2,646	34,591	5,957
Arkansas	920	1,017	750	-----	-----	409	-----
Kentucky	1,087	1,427	1,096	-----	-----	2,799	-----
Nebraska	1,913	2,100	1,670	3,744	-2,074	16,504	4,093
Kansas	1,899	2,097	1,651	1,966	-315	9,893	2,399
Texas	5,791	6,146	4,218	3,663	555	9,379	4,468
Colorado	1,110	1,211	941	2,151	-1,210	1,634	2,775
California	906	1,712	1,080	1,990	-910	2,775	1,771
48 State Total	37,466	49,896	33,783	25,196[1/]	8,587	201,544	32,503

1/ See corresponding footnotes on Table 25.

Table 29. Numerical change of various livestock related activities for 10 states, 1962 to 1971.

State	Beef Cows	All Cows	Potential Calves Available 1/	Fed Cattle	Potential Calves over Cattle Fed	Feed Grain Production	Additional Feed Grain Required 1/
			(000)			(000 tons)	
Minnesota	153	-301	111	266	-107	6,480	476
Illinois	42	-273	26	-216	334	9,027	-320
Iowa	489	50	335	1,338	-657	11,884	1,980
Arkansas	69	-68	421	2/	3/	125	3/
Kentucky	459	250	353	2/	3/	1,882	3/
Nebraska	334	181	221	1,922	-1,475	4,517	2,133
Kansas	512	336	404	1,192	-612	4,218	1,454
Texas	1,295	1,046	1,361	2,907	-1,316	2,806	3,547
Colorado	815	269	239	1,336	-1,093	740	1,723
California	48	-27	210	146	119	514	130
48 State Total	9,235	2,517	8,099	10,564	-1,091	61,846	13,628

1/ See corresponding footnotes Table 25.

2/ Data not available

3/ Calculation requires number of fed cattle.

States (Table 30). Iowa has a locational advantage over Illinois for western feeder cattle and neither has any real advantage for feeder cattle from the western part of the Southeast. Thus Illinois has an advantage only for feeder cattle coming from directly south or east.[1/] To the south, Iowa and Illinois are both facing competition from the feed lots in the Southern Plains.

In the Southern Plains, Texas has experienced the most rapid rate of gain with a 384 percent increase in fed beef production between 1962 and 1971. The increase in fed cattle production will require an estimated additional 3.5 million tons of feed grains each year, (Table 29). This increased demand corresponds to an increase of only 2.8 million tons in annual production of feed grains. The fed cattle sector can obtain more of its demands by bidding feed grains from other sources but increases in pork production also require larger amounts of feed grains. Following this pattern Texas may have an automatic restraint incorporated into the expansion of the fed cattle sector. That is, if Texas must become an importer of feed grains it will then be on the competitive level of Colorado and much of the Southwest where feed grain supplies do not meet the demand.

With the feed grain restraint in Texas, states such as Kansas and Nebraska, where annual feed grain production increased more than the demand for cattle feeding, may be areas where future expansion occurs. These states have access to the feeder supplies in the Range States and Southeast and direct transportation routes to the west coast markets. Any expansion in the wheat market could affect the production of feed grains in Kansas and Nebraska reducing their potential for future expansion of cattle feeding.

1/ For a breakdown of the feeder imports to Illinois see Neil R. Martin, Jr. David C. Petriz and Roy N. Van Arsdall, The Illinois Beef Industry, Characteristics, Trends and Inventories, AERR-101, Department of Agricultural Economics-Agricultural Experiment Station, University of Illinois, Urbana Champaign, 1969. pp. 5-7.

Table 30. Percent change of various livestock related activities for 10 states, 1962 to 1971.

State	Beef Cows	All Cows	Potential Calves Available	Fed Cattle	Potential Calves Over Cattle Fed	Feed Grain Production
Minnesota	40.0	-16.6	10.5	43.7	-26.8	63.2
Illinois	5.9	-20.6	4.4	-17.1	43.8	44.2
Iowa	47.6	2.6	32.1	49.8	-33.0	52.3
Arkansas	8.1	-6.3	128.0	1/	2/	44.0
Kentucky	73.1	21.2	47.5	1/	2/	48.7
Nebraska	21.2	9.4	15.2	105.5	238.3	37.7
Kansas	36.9	19.1	32.4	154.0	220.9	74.3
Texas	28.8	20.5	47.6	384.5	70.3	42.7
Colorado	36.2	28.6	34.0	163.9	130.9	82.8
California	5.6	-1.6	24.1	7.9	11.6	22.7
48 State Total	32.7	5.3	31.5	72.2	-11.3	44.3

1/ Data not available.

2/ Need data for fed cattle numbers to calculate this number.

California is feeding almost twice as many cattle as it has potential feeders (Table 28). The dairy sector competes with cattle feeding for feed grains and as the population increases the demand for milk will increase, putting more pressure on the feed grain sector. Importing feed grains and feeders was a viable alternative before refrigerated transport became a true possibility. Now the shipment of carcasses to the meat deficit areas is a more efficient means of resource utilization. Thus California, as well as the other west coast states, will turn more and more to the feed lot operations of the interior plains to supply them with fed beef.